FOURTEENTH ANNUAL REPORT

OF THE

SANITARY COMMISSIONER

FOR

MADRAS,

1877.

WITH

APPENDICES

CONTAINING

REPORT ON THE MEDICAL AND SANITARY ASPECTS OF THE FAMINE OF 1876-77, WITH NOTES ON THE PATHOLOGY OF FAMINE DISEASES AND STATISTICAL TABLES OF THE GENERAL POPULATION AND VACCINATION.

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FOURTEENTH ANNUAL REPORT

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1877.

SECTION I.

METEOROLOGY AND PRICES OF FOOD.

METEOROLOGY.

1. The peculiarities of the year 1877, as regards climate in the Madras Presidency, were—1*st*, the intensity of the sun's heat during the early months of the year; 2*nd*, a cyclonic storm on 20th May, giving in the south-eastern coast districts a plentiful, and in the neighborhood of Madras, a copious downpour of rain; 3*rd*, a delayed south-west monsoon, with "breaks" so prolonged that in many of the districts depending on the early rains, the early crops either failed, or were greatly delayed on account of the deficient moisture; 4*th*, a very copious and general rainfall in September and October continuing on to the usual season of the north-east monsoon; 5*th*, violent storms and floods in the southern districts of Tanjore, Tinnevelly, and Madura during the north-east monsoon, with partial or complete failure of the north-east rains in the coast districts north of Nellore.

Solar heat.

2. Mr. Pogson's published returns give the monthly means of the black bulb thermometer *in vacuo* at the Madras Observatory, compared with the means of the previous 20 years, and from these observations it will be seen that the intensity of the solar heat during the early part of the year was very marked.

If the minimum sun spot period be, as surmised, also the time of great heat and drought on the earth's surface within the tropics, the condition of Southern India in 1875, 1876, and a part of 1877, may be referred to in support of the theory. If a low Nile be held to indicate deficient rainfall in equatorial Africa, then the fact is clearly in support of the theory of the sun's influence on climate as regards that continent; and if we note further the condition as to drought of countries outside the tropical belt, as California, North-Western China, Northern Australia, and Natal in 1877, it will be apparent that great heats and drought have been marked phenomena of the year elsewhere than in India.

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Return showing the greatest Solar Heat in Vacuo as recorded in the Madras Observatory during the Year 1877 compared with Average of past years.

	—	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Greatest Solar Heat in Vacuo.	1877	144·7	146·5	143·5	138·5	135·2	141·7	144·4	143·8	143·2	140·1	135·1	138·4	141·3
	Average of past years.	134·0	134·5	136·5	139·0	140·5	135·0	133·0	133·1	136·5	133·3	131·5	133·6	135·0

Note.—If, as appears to be now pretty evident, the minimum frequency of solar spots, corresponding to maximum solar heat and minimum rain-fall at places not far from the equator, is now past, further deficiency in Southern India need no longer be feared for several successive years; but its recurrence between 1887 and 1889 may be as certainly anticipated as that of any other natural periodical phenomenon with the laws and working of which we are already much better acquainted.

(Signed) N. R. POGSON,
Government Astronomer.

Rainfall.

3. The rainfall of 1877 has been remarkable more for the peculiarity of its distribution than for actual deficiency. Taking the mean readings of the 228 registering stations, we find the following results :—

Mean of 5	years	ending	1874,	47·87 inches	on 62 days.
Do.		do.	1875,	37·26 „	56 „
Do.		do.	1876,	27·81 „	42 „
Do.		do.	1877,	47·95 „	65 „

4. In eleven of the revenue districts, *i.e.*, Bellary, Coimbatore, Kistna, Madras, Madura, Malabar, Salem, South Arcot, Tanjore, Tinnevelly, Trichinopoly, the total rainfall in 1877 was equal to the average, in some cases very much in excess, while in the other nine districts, *i.e.*, South Canara, Chingleput, Cuddapah, Ganjam, Godavery, Kurnool, Nellore, North Arcot, and Vizagapatam, the aggregate rainfall in 1877 was deficient in comparison with the mean results of the five years ending 1874. Of course a mean of five years' rainfall is not a true mean; but we have not the figures for a longer period, and some years must elapse before the true seasonal averages can be derived from the records of rainfall.

5. In the month of January rain fell in Ganjam, Vizagapatam, Godavery and Kistna; in February, March and April a larger quantity of rain fell again in those districts, but in other parts of the Presidency the rainfall was trivial in amount, and of no use for agricultural work, considering the previous heat and drought of the soil.

6. In May occurred a cyclonic disturbance in the Bay of Bengal, accompanied by heavy rain in many districts. Thus in Bellary 2 inches, in Chingleput 10 inches, in Cuddapah 3 inches, in Ganjam 8 inches, in Vizagapatam 9 inches, in Godavery 5 inches; Kistna 5 inches, Nellore 7 inches, Madras (Observatory) 21 inches, North Arcot 4 inches, Salem 3 inches, South Arcot 6½ inches, Tanjore 3½ inches, Trichinopoly 4 inches. This rain was of great service in replenishing water-supply, but it did not affect the level of the subsoil water so much as might have been anticipated. In many parts of the country subsoil water continued to recede until the heavy rains of September and October fell.

7. The rains of the south-west monsoon are due on our western coast districts in the first week in June. There was quite an average fall in South Canara in June, 41 inches being registered in 26 days, and in Malabar also the June rain was rather above the average, 39·6 inches being registered in 26 days' fall. But the July rain on the western coast showed a very remarkable diminution, being only 23·7 inches in Canara on 28 days against an average of 49 inches in 30 days; and in Malabar only 11 inches on 22 days against an average of 33 inches in 24 days.

8. It is very evident that the June rainfall did not penetrate far into the peninsula, and that it was chiefly confined to the country below the western ghauts. The July rainfall was remarkably light on the Malabar Coast, and above the ghauts there was very general failure of the rain in that month, one of the most important in connection with the cultivation of dry cereals.

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9. In August the delayed monsoon began to fall heavily on the western coast, 34 inches being registered in Canara against an average of 21·4 inches, and 25·3 inches in Malabar against an average of 11·8. The rainfall continued high on the western coast through September and October, the Canara registration showing 19·2 and 11·9 inches for those months respectively against an average of 15·3 and 9·5 inches; the Malabar District returns show 14·9 inches for September against an average of 9·3; and 18·7 inches in October against an average of 8·5.

10. With the setting in of the delayed monsoon on the western coast, rain began to fall very generally over the central plateau of Mysore, the Deccan, and Ceded Districts, and reached the eastern coast districts before the end of August. In September and October there fell a copious supply of rain that would have been more seasonable had it appeared two months before, but the general effect on the country after the prolonged drought and rest of vegetable life was simply marvellous. Unhappily the late arrival of the rains, and the copious moisture, developed blights, rusts, and insect life to such an extent that a large quantity of the early cholum and other dry cereals failed, so that the famine-stricken poor had but a scant supply of locally-produced food to compensate them for their long privation.

11. The north-east monsoon was late and the rains irregular, being excessive in the southern districts of Tinnevelly, Tanjore and Madura, but below the average in Coimbatore, Salem, North Arcot and Nellore, while in the northern districts where the heaviest rain usually falls in September and October during the south-west monsoon season, there was a very general failure of the late rains, and scarcity and distress were apprehended at the end of the year.

12. In the following table is included the monthly rainfall of each district, calculated from the means of the several registering stations, showing the results separately for the abnormal years of 1875, 1876, and 1877 as compared with the averages of five previous years :—

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Table showing the comparison of Monthly Rainfall in the Madras Presidency during 1875, 1876, *and* 1877 *with the Average of* 5 *Years ending* 1874.

Districts.		No. of Places of Observation.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.		Total.	
			Rainfall.	Days.	Rainfall.	Days.	Rainfall.	Days.	Rainfall.	Days.	Rainfall.	Days.	Rainfall.	Days.	Rainfall.	Days.	Rainfall.	Days.	Rainfall.	Days.	Rainfall.	Days.	Rainfall.	Days.	Rainfall.	Days.	Rainfall.	Days.
Bellary ...	Average of 5 years...	16	0·08	...	0·01	...	0·06	...	0·62	2	2·86	5	2·80	6	2·68	7	3·41	7	6·22	10	6·89	9	0·86	2	0·25	1	26·74	49
	1875		...	...	...	...	0·33	2	0·11	...	1·56	5	3·59	6	3·08	7	3·54	6	4·08	7	3·59	6	0·03	...	0·01	...	19·92	39
	1876		...	...	...	...	0·47	1	0·42	2	0·48	1	2·96	5	1·03	4	1·18	4	1·47	3	0·22	1	0·06	...	...	...	8·29	21
	1877		...	...	0·01	...	0·40	1	0·52	1	2·16	3	3·86	7	2·15	4	1·78	5	6·93	13	8·82	13	0·93	1	0·75	1	28·31	49
Canara ...	Average of 5 years...	5	0·99	...	0·21	...	0·16	...	1·19	2	9·77	5	39·5	26	49·05	30	21·47	24	15·81	21	9·54	14	1·79	4	0·28	1	149·26	127
	1875		...	...	...	...	0·09	...	0·59	1	2·14	5	31·07	26	40·17	30	25·15	27	10·80	19	3·58	6	0·79	2	0·19	...	114·57	116
	1876		...	...	...	...	0·98	2	1·51	4	1·19	4	34·90	23	49·06	30	20·81	30	7·33	16	0·76	2	0·59	1	0·05	...	117·17	112
	1877		...	...	0·01	...	...	...	1·29	3	1·20	6	41·28	26	23·71	28	33·92	29	19·20	22	11·98	22	1·48	4	0·92	1	134·99	141
Chingleput...	Average of 5 years...	7	1·05	1	2·11	1	0·32	...	0·49	...	3·22	2	2·72	5	4·22	9	4·99	9	7·04	8	10·56	10	13·32	12	2·99	4	53·08	61
	1875		0·20	1	...	...	0·24	1	0·24	...	0·85	2	1·68	4	2·50	4	6·95	11	3·80	5	4·99	9	6·26	8	2·13	5	29·84	50
	1876		...	...	...	...	...	...	0·44	1	0·78	3	2·66	5	3·69	9	2·94	6	4·07	5	0·45	1	4·30	4	...	...	19·33	33
	1877		0·16	1	...	...	0·40	...	...	...	10·60	4	2·31	5	0·93	3	2·73	8	6·86	10	8·09	11	10·33	11	2·50	4	44·91	57
Coimbatore...	Average of 5 years...	10	0·26	...	0·67	1	0·49	1	1·89	3	2·77	5	2·14	5	1·78	5	2·56	4	2·95	6	4·94	9	4·37	7	0·61	2	35·43	48
	1875		0·09	...	...	...	0·67	7	2·48	4	3·51	6	1·88	5	0·95	4	1·18	3	1·30	4	8·81	13	1·98	5	0·28	1	23·13	46
	1876		...	...	...	...	0·41	1	1·22	4	5·00	7	0·60	2	1·55	5	2·96	4	2·65	4	2·12	4	0·83	3	0·14	...	17·48	35
	1877		...	...	0·01	...	0·59	1	1·06	2	2·32	5	2·40	6	0·39	2	0·64	3	5·85	10	9·25	13	4·00	8	3·75	6	30·26	56
Cuddapah ...	Average of 5 years...	11	0·42	...	0·22	..	0·22	...	0·25	...	3·05	...	2·48	3	3·39	5	4·11	7	7·07	6	9·42	9	3·27	9	0·76	5	34·65	44
	1875		...	...	...	..	0·53	1	0·23	1	2·05	3	...	...	2·34	6	6·12	10	6·13	9	2·98	6	0·52	1	0·70	2	21·60	45
	1876		...	...	...	...	0·42	1	0·42	1	0·44	1	1·33	3	0·78	4	3·30	6	1·02	3	0·24	1	0·25	1	...	...	7·99	20
	1877		0·01	...	0·02	...	1·35	2	0·19	...	3·30	4	4·32	6	1·25	3	1·64	5	7·21	12	7·87	11	1·65	4	0·22	1	28·53	48
Ganjam ...	Average of 5 years...	17	0·44	1	0·13	...	0·68	1	1·26	3	1·80	3	8·73	8	6·55	11	7·70	13	7·26	12	10·12	9	1·79	2	0·65	1	47·11	64
	1875		0·61	1	...	...	0·05	...	0·55	2	2·32	5	3·67	6	4·86	9	5·33	10	16·93	14	7·87	7	...	...	...	...	42·19	55
	1876		...	...	...	...	0·51	1	0·41	1	1·61	3	3·24	7	4·87	9	7·47	13	10·35	12	8·79	6	...	...	...	...	37·37	52
	1877		0·92	2	2·66	6	1·62	3	2·91	5	7·99	7	3·02	6	3·69	8	5·17	10	6·00	9	2·59	5	0·14	...	0·13	...	36·84	61
Godavery ...	Average of 5 years...	20	0·32	...	0·20	...	0·40	...	0·44	1	1·82	3	4·53	6	6·36	11	4·69	7	8·39	11	10·84	11	1·75	2	0·45	1	40·19	53
	1875		0·12	1	0·08	...	0·18	...	0·24	...	2·82	5	2·75	5	6·20	10	7·28	10	9·09	13	7·91	7	0·26	...	...	...	36·88	52
	1876		...	...	...	...	0·30	...	0·38	...	1·20	3	2·88	6	5·15	8	7·82	10	5·29	6	1·27	2	0·06	...	...	...	23·73	34
	1877		0·94	1	1·40	3	0·94	2	0·48	1	4·83	4	1·66	4	3·12	6	3·95	7	6·17	10	5·85	9	0·14	...	0·01	...	29·49	47
Kistna ...	Average of 5 years...	11	0·87	...	0·06	...	0·30	...	0·24	...	1·51	3	3·16	6	4·82	10	4·32	9	6·67	11	8·35	10	1·89	3	0·31	1	32·50	53
	1875		0·63	1	...	...	0·55	1	0·69	1	1·26	2	2·12	6	4·96	12	8·38	12	7·24	11	9·45	8	0·22	1	0·11	1	35·01	55
	1876		...	...	...	...	0·06	...	0·05	...	0·89	2	3·48	6	2·91	7	6·01	13	2·42	5	0·24	1	0·44	1	...	...	16·51	35
	1877		0·70	2	0·48	1	2·70	3	0·26	...	5·23	3	1·16	3	3·86	5	3·76	8	6·76	10	6·26	10	1·06	1	0·11	1	32·34	47

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Table showing the comparison of Monthly Rainfall in the Madras Presidency during 1875, 1876, *and* 1877 *with the Average of* 5 *Years ending* 1874—(Continued).

Districts.		No. of Places of Observation.	January. Rainfall.	January. Days.	February. Rainfall.	February. Days.	March. Rainfall.	March. Days.	April. Rainfall.	April. Days.	May. Rainfall.	May. Days.	June. Rainfall.	June. Days.	July. Rainfall.	July. Days.	August. Rainfall.	August. Days.	September. Rainfall.	September. Days.	October. Rainfall.	October. Days.	November. Rainfall.	November. Days.	December. Rainfall.	December. Days.	Total. Rainfall.	Total. Days.
Kurnool ...	Average of 5 years ...	9	0·16	...	...	...	0·03	...	0·32	...	2·01	4	3·46	7	5·11	10	4·23	8	8·87	10	5·20	9	0·89	2	0·40	1	30·68	51
	1875		...	...	...	...	0·37	1	0·15	1	2·25	2	2·44	6	4·60	10	4·00	7	5·88	8	5·45	6	...	...	...	...	26·94	41
	1876		...	...	...	...	0·32	1	0·28	1	0·07	..	2·19	4	0·86	3	2·89	6	1·23	2	0·06	1	0·16	...	...	...	8·06	18
	1877		...	...	...	...	0·90	2	0·27	1	2·32	3	2·20	4	0·81	3	2·23	6	7·97	12	5·15	8	0·56	1	0·09	...	22·50	40
Madras ...	Average of 5 years ...	1	1·40	2	1·32	2	0·58	1	0.61	1	2·49	2	3·63	11	5·14	15	4·40	14	6·36	13	15·92	16	17·33	17	4·62	7	63·80	101
	1875		...	...	...	...	1·18	1	0·76	1	0·07	2	0·86	5	1·76	12	7·04	13	4·60	14	6 47	17	11·19	16	3·18	12	37·11	93
	1876		0·12	1	...	...	..	...	0·71	1	1·19	5	3·10	14	3·77	16	3·00	13	3·26	9	1·04	6	5·30	5	0·11	3	21·60	73
	1877		0·01	1	...	...	0·03	1	...	...	21·27	6	2·36	9	1·22	9	2·49	19	3·15	13	8·56	14	21·25	17	5·86	9	66·20	98
Madura ...	Average of 5 years ...	13	0·87	2	1·22	3	0·47	1	1·67	3	1·80	3	1·19	2	0·82	2	2·62	5	1·87	4	4·34	8	5·36	9	1·65	3	23·88	45
	1875		0·21	...	0·10	...	0·57	1	3·59	5	1·93	2	1·85	3	1·02	2	1·70	30	1·84	3	11·15	14	4·73	8	0·95	1	29·64	44
	1876		0·07	...	..	...	0·90	1	2·11	2	1·68	5	0·51	1	0·88	2	2·85	6	1·53	3	2·90	5	2·49	4	2·65	3	18·52	32
	1877		0·02	...	0·01	...	1·27	1	1·25	2	1·84	4	0·83	2	0·82	2	0·89	2	4·87	8	10·83	12	12·21	14	12·85	10	47·24	57
Malabar ...	Average of 5 years ...	15	0·73	1	0·45	1	0·61	1	3·56	6	9·96	11	34·38	25	33·2	24	11·87	19	9·87	16	8·56	13	3·58	6	0·86	2	117·08	135
	1875		0·05	...	...	...	0·45	1	2·90	3	4·73	7	33·81	25	30·12	30	11·40	20	4·93	13	6·09	11	1·88	3	0·40	1	96·81	114
	1876		...	...	0·01	...	1·93	4	1·74	4	2·28	6	21·84	23	37·49	30	12·23	22	5·63	9	2·41	5	1·15	3	0·07	1	86·78	106
	1877		..	...	0·13	1	0·60	2	2·63	6	4·78	9	39·62	26	10·97	22	25·31	24	14·90	19	18·75	21	4·07	7	2·30	5	124·11	142
Nellore ...	Average of 5 years ...	17	0·84	1	0·68	...	0·14	...	0·12	...	1·53	2	1·55	3	3·16	6	3·26	5	4·68	7	8·65	9	8·82	7	2·04	2	41·67	42
	1875		0·58	1	0·04	...	0·37	1	0·20	1	0·99	2	0·83	3	2·44	6	4·43	8	5·02	8	8·16	6	1·80	3	3·72	5	28·58	44
	1876		0·01	...	...	...	0·10	...	0·04	...	1·26	3	2·26	4	1·08	3	3·90	6	0·89	2	0·24	1	1·55	3	...	...	11·56	21
	1877		0·19	...	0·36	1	1·66	2	0·17	1	6·70	3	1·44	3	0·89	2	0·95	3	5·53	10	11·34	11	4·62	5	2·69	4	36·54	45
North Arcot.	Average of 5 years ...	17	0·44	..	1·23	...	0·61	...	0·34	1	4·90	3	2·62	5	3·71	7	4·25	8	8·33	9	8·69	10	6·71	8	1·36	3	43·19	54
	1875		0·32	...	...	...	0·22	...	0·18	1	2·32	5	2·10	4	2·22	5	9·30	13	3·40	6	3·55	7	1·30	4	1·25	4	26·16	40
	1876		...	...	...	...	0·10	...	0·21	1	2·22	5	3·28	7	3·37	7	2·78	6	4·17	6	0·81	2	1·68	4	...	...	18·61	38
	1877		...	...	0·01	...	0·61	1	0·41	1	4·49	5	2·88	5	0·91	2	2·60	5	10·39	14	9·93	12	4·89	8	1·77	3	38·89	56
Salem ...	Average of 5 years ...	10	0·13	...	0·49	1	0·62	1	1·05	2	5·45	5	2·28	5	2·96	6	4·92	8	7·24	10	7·33	9	5·14	6	1·22	13	38·83	66
	1875		...	...	...	...	0·81	1	2·33	3	4·41	8	2·99	4	1·39	3	4·02	6	3·53	5	6·64	9	1·67	3	0·12	...	27·96	42
	1876		...	...	...	...	0·56	1	0·53	2	4·18	7	1·75	3	3·06	5	3·65	6	4·03	6	1·10	2	0·80	2	0·09	...	19·76	34
	1877		...	...	...	...	1·42	2	0·55	1	3·46	7	3·22	5	0·73	2	1·09	4	11·37	15	12·58	15	4·01	6	2·05	4	40·53	61
South Arcot.	Average of 5 years ...	8	0·26	...	1·65	1	0·22	...	1·01	...	3·44	3	1·98	4	3·34	6	5·50	8	6·51	9	8·97	10	10·67	11	3·39	4	46·94	55
	1875		0·39	1	...	...	0·11	...	0·79	1	2·91	5	0·87	2	2·22	4	10·16	12	6·53	8	4·26	7	4·37	9	1·71	4	34·32	52
	1876		0·01	...	...	...	0·04	...	1·27	2	1·81	4	2·49	4	2·53	7	6·18	10	3·27	5	2·21	3	4·89	5	0·46	1	25·15	41
	1877		...	...	...	...	...	...	0·11	...	6·59	5	1·86	4	1·88	4	1·29	5	3·50	13	9·84	12	3·52	11	7·59	9	46·18	63

Table showing the comparison of Monthly Rainfall in the Madras Presidency during 1875, 1876, *and* 1877 *with the Average of* 5 *Years ending* 1874—(Continued).

Districts.		No. of Places of Observation.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.		Total.	
			Rainfall.	Days.	Rainfall.	Days.	Rainfall.	Days.	Rainfall.	Days.	Rainfall.	Days.	Rainfall.	Days.	Rainfall.	Days.	Rainfall.	Days.	Rainfall.	Days.	Rainfall.	Days.	Rainfall.	Days.	Rainfall.	Days.	Rainfall.	Days.
Tanjore ...	Average of 5 years ...	10	1·43	2	1·79	2	0·21	...	1·99	2	2·92	2	2·05	3	2·75	5	4·61	9	4·46	9	8·63	11	10·62	13	5·16	9	46·62	67
	1875		0·09	...	0·03	...	0·11	...	1·23	3	1·88	3	1·00	3	0·85	2	4·53	7	3·74	7	6·51	11	7·99	13	2·20	4	30·16	54
	1876		...	...	...	...	0·34	1	0·30	...	2·84	5	1·06	3	0·76	2	6·37	10	2·18	3	1·87	4	6·72	6	6·52	5	28·96	39
	1877		0·19	1	...	...	0·08	...	...	...	3·58	3	1·41	2	1·88	4	1·16	4	5·71	9	10·39	11	13·55	16	13·46	12	51·41	62
Tinnevelly...	Average of 5 years ...	11	2·49	3	1·81	3	1·2	2	1·55	3	1·39	3	0·79	2	0·32	1	0·74	2	1·13	2	2·85	6	8·06	11	1·86	4	24·19	42
	1875		0·21	...	0·14	1	0·92	2	2·22	3	0·90	2	0·42	1	0·46	2	0·57	1	0·64	2	7·06	11	4·18	8	1·95	3	19·68	37
	1876		...	...	...	...	1·15	1	2·05	3	1·27	2	0·12	1	0·48	2	0·26	1	1·55	2	4·16	7	3·66	5	1·16	3	14·86	27
	1877		0·01	...	0·18	1	2·28	3	1·55	3	1·14	2	1·75	3	0·19	1	0·57	3	2·17	5	7·58	12	12·69	17	15·29	12	45·40	62
Trichinopoly	Average of 5 years ...	5	0·67	1	1·14	2	0·07	...	1·39	2	2·93	4	2·15	3	2·04	3	4·55	6	4·35	6	8·59	12	7·07	10	2·33	4	37·28	53
	1875		0·22	1	...	...	0·10	...	1·53	2	3·14	5	1·30	3	0·78	2	4·20	7	4·16	7	7·08	12	3·65	9	1·20	3	27·36	51
	1876		...	...	...	...	0·45	1	0·60	1	4·41	7	1·09	2	2·54	2	5·00	8	4·14	5	1·85	3	1·86	3	1·45	2	23·37	35
	1877		0·01	...	...	...	0·51	1	0·15	...	4·08	7	0·88	3	0·42	2	1·29	3	7·69	11	11·77	16	5·29	10	5·49	11	37·58	64
Vizagapatam	Average of 5 years ...	15	0·53	1	0·33	...	0·31	...	0·92	1	2·04	3	5·15	7	5·51	8	6·23	9	6·99	10	10·75	9	1·85	2	1·10	1	41·71	51
	1875		0·23	1	...	...	0·07	...	0·27	1	2·45	5	1·88	4	4·45	7	4·61	6	13·09	13	10·30	9	0·06	...	0·02	...	37·43	46
	1876		..	...	...	...	0·19	1	0·15	...	1·50	3	3·29	5	2·22	5	6·63	11	6·02	10	11·29	4	0·42	1	..	...	31·70	39
	1877		1·13	2	2·05	5	2·33	2	1·74	3	3·85	6	2·19	4	4·39	8	3·31	7	7·72	10	3·88	6	0·11	1	0·05	...	37·75	54
Total ...	Average of 5 years ...	228	0·72	1	0·81	1	0·39	...	1·05	2	3·38	4	6·27	7	7·35	9	5·46	9	6·54	9	8·61	10	5·65	7	1·62	3	47·87	62
	1875		0·20	...	0·17	...	0·39	1	1·03	2	2·22	4	3·45	6	5·96	8	6·49	11	5·84	9	6·49	9	2·59	5	1·01	4	37·26	56
	1876		0·017	...	0·005	...	0·46	1	0·74	2	1·81	4	4·75	6	6·40	8	5·39	10	3·64	5	2·20	3	1·86	3	0·78	1	27·81	42
	1877		0·21	...	0·36	1	0·99	2	0·78	1	5·34	5	6·00	6	3·19	6	4·81	8	7·75	12	9·04	12	5·58	7	3·89	5	47·95	65

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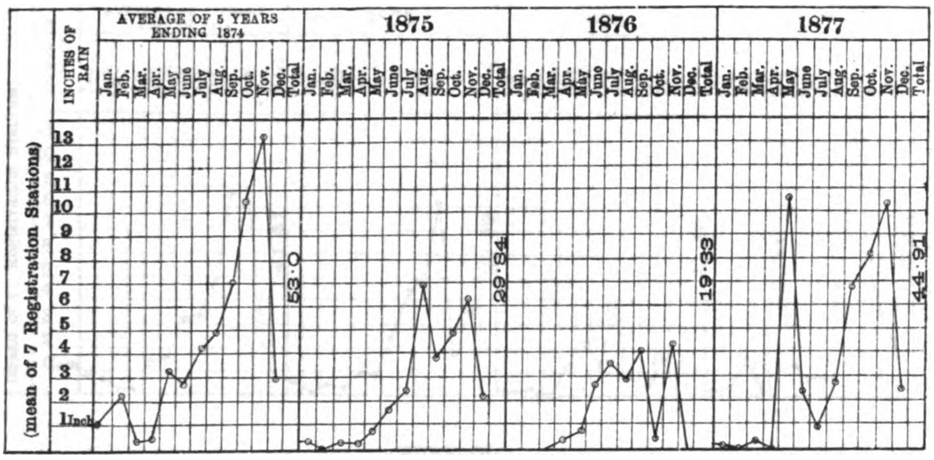
DIAGRAMS SHOWING THE RAINFALL IN THE UNDERMENTIONED DISTRICTS OF THE MADRAS PRESIDENCY FOR 3 YEARS ENDING 1877. COMPARED WITH AVERAGE OF 5 YEARS ENDING 1874.

CHINGLEPUT



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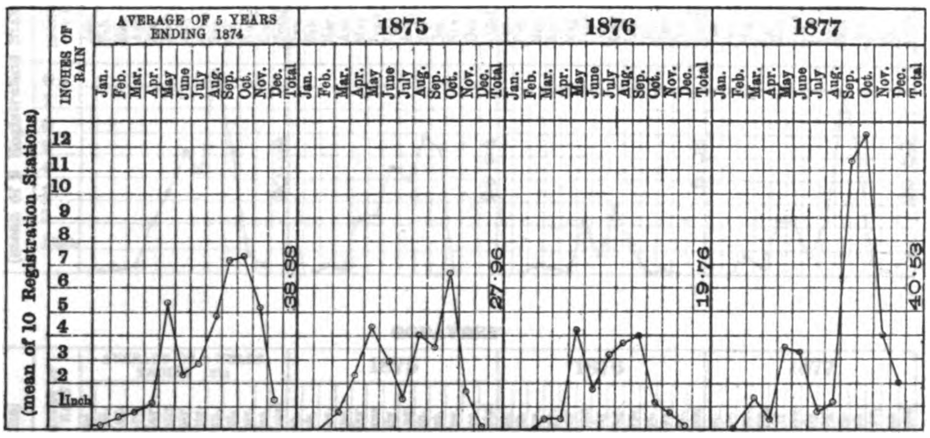

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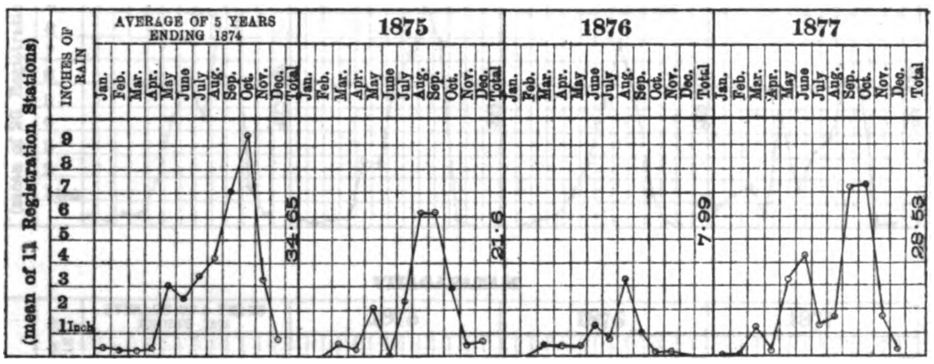

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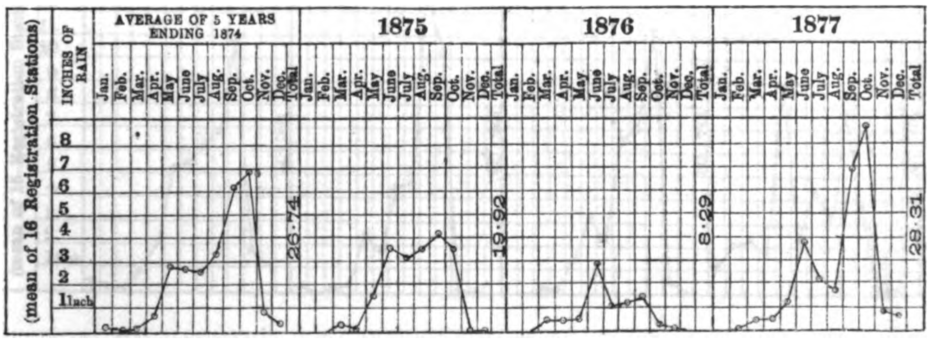

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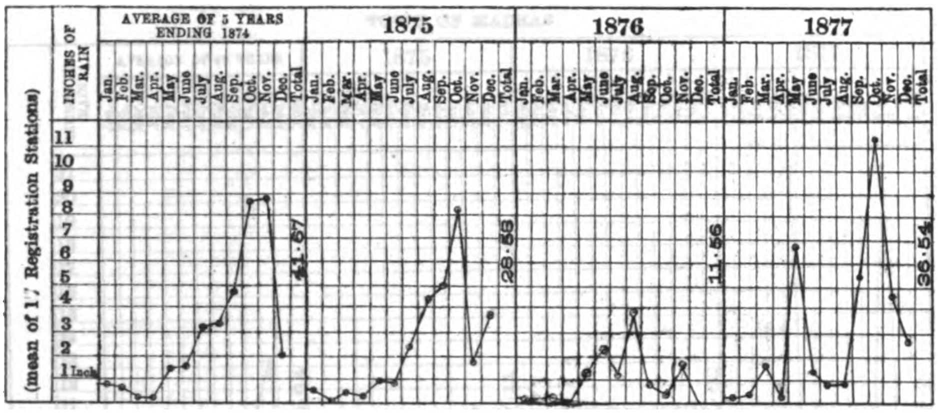
NELLORE



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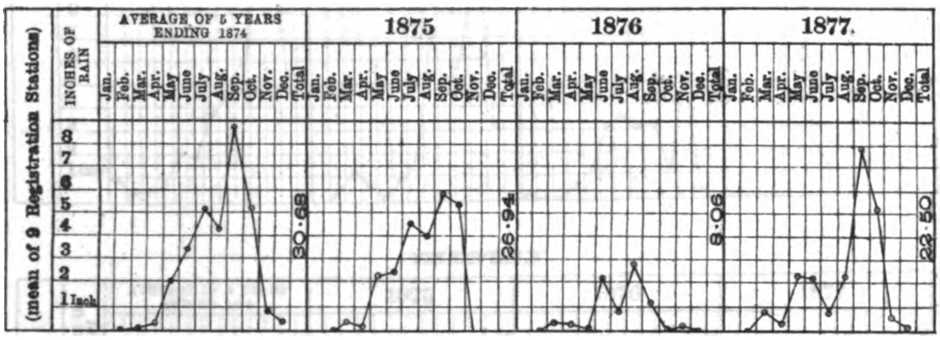

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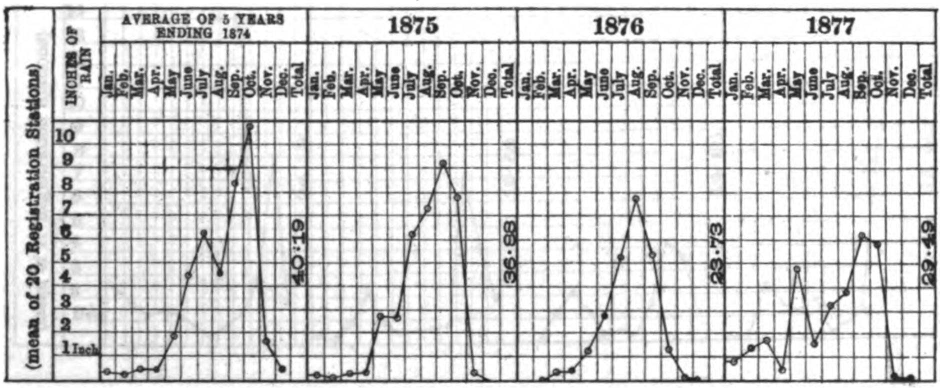
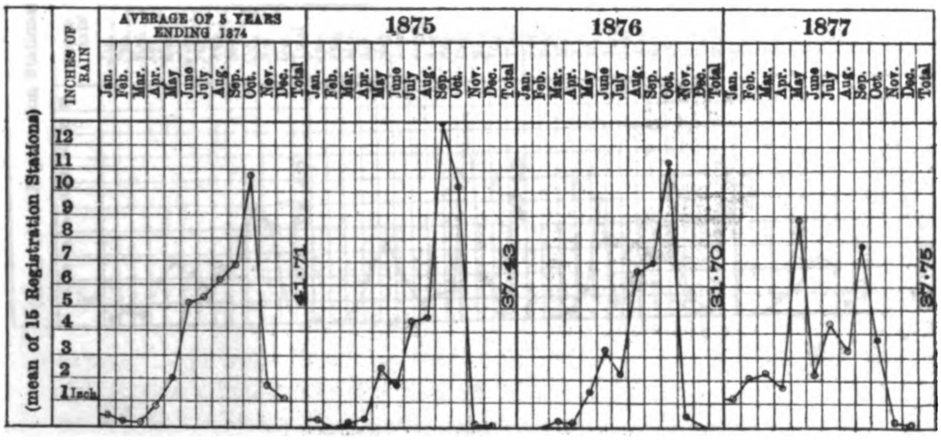


VIZAGAPATAM



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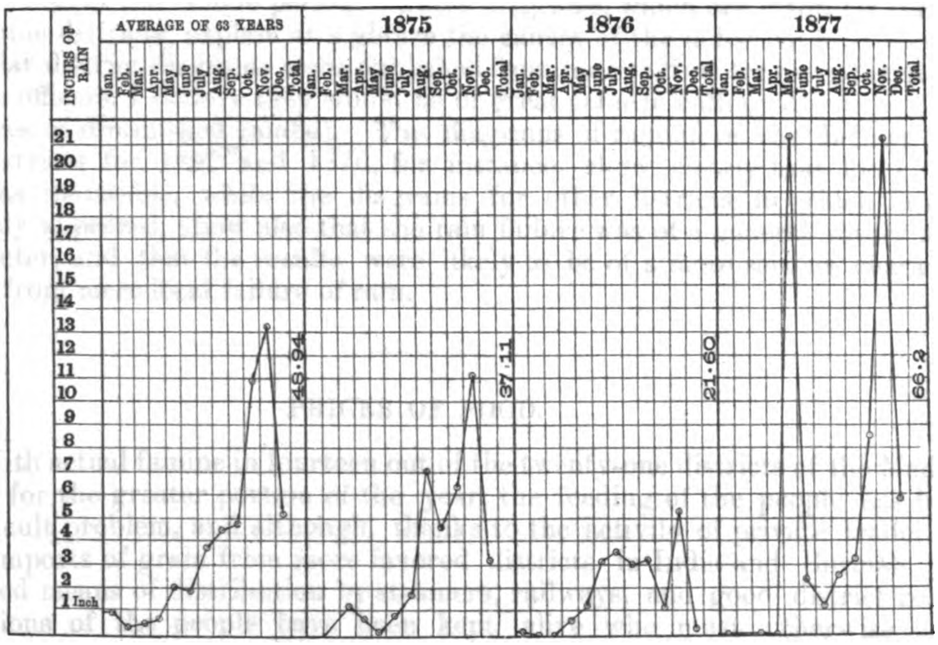
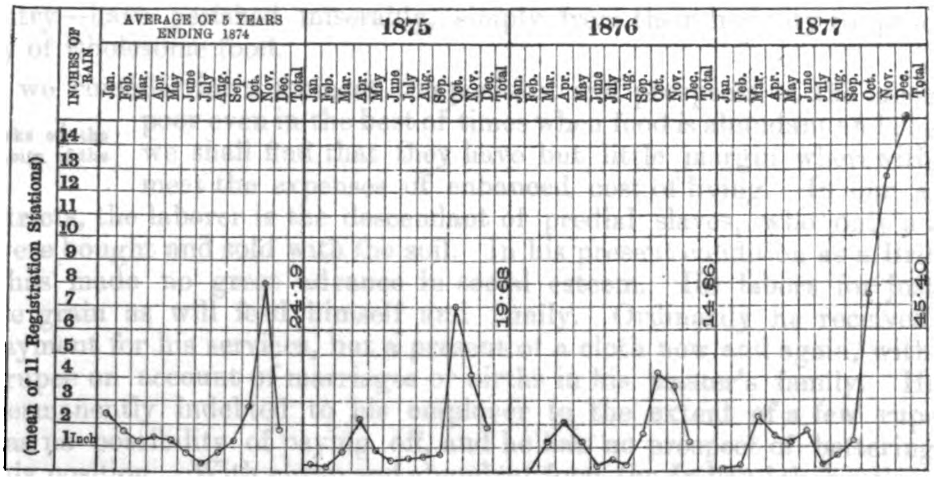
DIAGRAMS SHOWING THE RAINFALL IN THE UNDERMENTIONED DISTRICTS OF THE MADRAS PRESIDENCY FOR 3 YEARS ENDING 1877. COMPARED WITH AVERAGE OF 5 YEARS ENDING 1874.

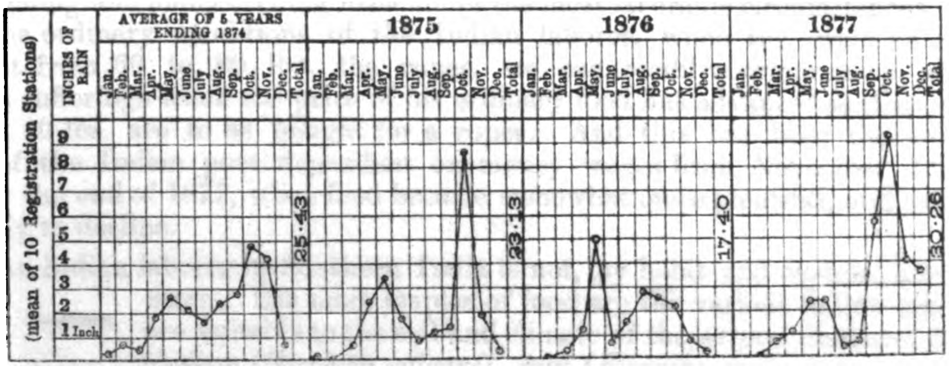
TOWN OF MADRAS



TINNEVELLY



COIMBATORE



13. Columns of figures however do not always convey clear ideas of relative value unless studied with care, and I have accordingly had projected in diagrams the average monthly rainfall and the results for 1875, 1876, and 1877 compared with the average, so as to indicate the deficient rainfall of the famine period. These diagrams, which are given for certain typical famine districts, explain at a glance the causes of the defective food-supply, and if similar district diagrams were published from time to time for the information of Revenue officers, I believe they would be of great value in calling attention to the consequences of diminished rainfall. The diagrams of rainfall of the Bellary and Kurnool districts for 1875 and 1876, for instance, show clearly that local food scarcity was inevitable, while the diagrams for other districts in which famine subsequently appeared, show also that the rain failure was of a general rather than local character, and that the results were likely to be of a more serious character than those from mere local failure of rain.

Diagrams of Rainfall.

PRICES OF FOOD.

14. With actual famine in fourteen out of the twenty-one districts of the Madras Presidency for the greater portion of the year, the feeding of the people has been a most difficult problem, and although, thanks to the activity of private trade, the enormous imports of grain from more favored districts in India and Burmah, and the improved means of distribution by steamers, railways, and good district roads, many millions of the people have been kept alive who must otherwise have perished; yet it is but too certain that an enormous number of the poorer classes of the people—who, by their labor and industry, contributed to the producing force of the country—have perished miserably, simply from their inability to procure a sufficiency of wholesome food.

15. If we consider for a moment the position and prospects of the laboring poor even in the best of times when food is abundant and cheap, we shall find that they have but little margin wherewith to meet the expenses of enhanced cost of living. In our agricultural districts, the laborer is the descendant of predial slaves, who only a few years ago were bought and sold with the soil. In his present condition as a British subject, he has made no great advance in social esteem. He labors for just as much coarse grain as will feed himself and family. Ordinarily he receives no money in payment for his services, but a present of a cloth now and again, with an occasional rupee on account of marriages or births in his master's family. He is generally permanently indebted to his employer to the extent of a few rupees, which he has no possibility of paying off, and he has no prospect of bettering or improving his position. With cheap and abundant food, the Indian laborer thrives, even under the hard circumstances of his fate, but if his family increases too fast, there is pinching and under-feeding even under the most favorable circumstances. If these are the ordinary conditions of the Indian laborer, when the grain he eats is valued at from 60 to 80 lbs. the rupee, we can readily comprehend what must be his sufferings when the price of his ordinary food has advanced so that only 15, or even 10 lbs. are to be bought for a rupee. And this has been the actual condition of the Indian poor dependent on money wages from November 1876, until nearly the end of 1877, when food became somewhat more plentiful, and prices began slowly to decline.

General remarks on the condition and habits of the laboring poor.

16. The Indian laborer in Southern India is not, by habit and custom, a rice-eater. His main staples of food are the various millets which are suitable to the soil and climate of the several districts, viz., cholum (*Sorghum vulgare*), ragi (*Eleusine coracana*), cumboo (*Penicillaria spicata*) and others, such as *Panicum frumentaceum*, *Panicum Italicum*, *&c.* He scarcely knows wheat, nor the way to use it. He eats certain beans, and pulses occasionally, but not to the same extent as do the people of Northern India. He has a great liking for animal food of every description. Nothing in this way comes amiss to him. Fish, snails, frogs, field-rats, game of every description, fowls, goats, sheep, bullocks, and pigs, are all eaten with avidity by

Food of the Southern Indians.

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the hard-working laboring man. In fact, there is no description of food obtainable from the vegetable or animal kingdom that the laboring classes of the people of Southern India will not use.

17. It is, perhaps, a fortunate circumstance in connection with the late terrible famine in Madras, that the omnivorous habits of the people were so marked. In Orissa Lord Napier and Ettrick was struck with the fact that a caste ridden Ooriah would lie down and die of starvation by the side of a fat bullock. The people of Southern India, on the other hand, will not only eat a fat bullock, but manage to pick up nutriment from the carcase of a beast that has died of their own complaint—chronic starvation.

18. It may truly be said that the laboring poor made a great effort to live. When their ordinary food failed them, they used roots, leaves, and fruits from the jungles, and picked the bones of every animal that died, or had to be killed on account of want of forage.

Imports during the Famine of 1876-77.

19. Grains of various descriptions were largely imported to different parts of the country. Berar and Central India sent down cholum, wheat, and gram to the Ceded Districts. On one occasion I came upon a lot of "Kessari" dhall, a kind of gram grown in the North-West Provinces, and the produce of a plant known as *Lathyrus sativus*, and which is reputed to produce paralysis in the lower limbs of those who eat it. Various kinds of peas and beans were imported from Bengal, but the chief import was rice, even to those parts of the country where rice is scarcely ever eaten by the poor.*

Effects of a change of food.—Rice instead of millets.

20. A change of food is probably a serious matter for a population under the best of circumstances, but the general substitution of a poor starchy food like rice, for the millets richer in albuminoid principles, was in my opinion one of the greatest disasters of the famine. Yet the change was unavoidable. The ordinary millets of the country were not to be bought in the quantity required by the people. The great bulk of the poor did not understand how to prepare wheat for food, the price of wheat was all along so high as to place it out of their reach, and rice was the only grain that came to market in great bulk, and that was fitted for use without further cleansing or grinding.

21. The ordinary food-grains of the people were grown to some extent under well irrigation, or in favorable situations, all through the famine period; but the growers were chiefly the ryots of the better class who kept the produce for home consumption, and although these grains were generally to be had in local markets on a small scale, the price was as high or higher than imported rice. Contractors for the supply of jail diets were in some cases unable to procure a sufficiency of the millets to feed a few hundred prisoners, and had to gain permission to issue rice instead. The early sowings of the dry cereals failed to a great extent through unseasonable weather, blight, and insects, so that it was not until October or November that the local production of food became at all equal to the demand, in the rural parts of the country.

Reserve stock of food-grains in underground pits.

22. The question of the ordinary reserve stocks of food in a country is always an important one. In famine times accurate information on this point is absolutely essential to successful administration, but in no part of the world perhaps is it more difficult to obtain precise knowledge on such points than in India. In districts where the people mostly live on dry millets it is the practice to store the cleaned grain either in pits under-ground, or in wattle and daub réceptacles within the house enclosure. If the protection is perfect these grains will keep for years, and as a fact the people prefer to eat old grain to new. From the scarcity of these dry grains in the market all through the worst period of the famine it may be inferred that stocks had run very low. No dealer would undertake to deliver a large

* The Board of Revenue have obligingly furnished me with a statement of imports by sea into the various ports of the Madras Presidency for October 1876 and December 1877. Of a total of 1,282,877 tons of grain, 1,038,917 consisted of rice or "paddy" (unhusked rice), and 243,960 tons of other grains. I have not at hand the imports of grain by railway from Bombay and Central India, but they are known to have been considerable. Importation was most active from January to April 1877, and again in August and September, but diminished in December to 31,000 tons from 118,000 tons in August.

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quantity so as to feed the inmates of a relief-camp or jail, but with all the difficulty of procuring grain of this description it is very certain that the more substantial of the farmers, artizans, &c., did hold, throughout the famine, considerable reserves of these dry grains, and that even the very extraordinary prices obtainable for them did not tempt the holders to get rid of their stores while the prospects of the continuance of famine were imminent. I became acquainted with an instance of a substantial ryot in the Bellary District, who, all through the famine, bought imported food at high prices for his laborers and household, and who, at the same time, had several pits stored with about 50,000 seers of old grain, which he kept as an insurance against starvation, but which he would not open until the prospects of a new crop were assured. This one instance was probably multiplied by thousands, and Mr. Price, the Collector of Cuddapah, informed me that after a plentiful fall of rain, old grain came out of the hidden stores for sale in considerable quantity, and I myself saw at Bangalore in October a long string of carts coming into the town with old ragi, while a few weeks before all the grain trade had been that of export from the town. Those who own stocks at such times are very reticent as to the amount of their possessions, and the obtaining of accurate information on the subject was a task beyond the resources of Government officials. The usages of the people lead them to store away when grain is cheap and plentiful. Railways and improved communications have no doubt tended to alter this wholesome practice, and to stimulate close sales, when prices in distant parts of the country offer a margin for profit. Improved communications help to take the food out of a district as well as offer facilities for bringing in supplies in times of dearth, and this two-fold action of easy transport has probably a very important bearing on the maintenance of reserves of food in a country. I have no doubt myself that the customs of the people in regard to the practice of storing abundant reserves of grain have been slowly changing, with the improved facilities of transport to distant markets, and that local reserves of grain are not so abundant as they were in former times, and that every recurring cycle of bad seasons will, from these causes, result in aggravated distress in the localities specially affected.

Prices of food-grains.

23. The prices of grain which were generally very high in January 1877, fell somewhat in the next two or three months, owing probably to the coming into the market of the small local spring crops, and also to excessive importation in the early months of the year. Importation was checked by the stationary prices, and did not increase until May or June, and as the prospects of the season being a good one diminished, the grain trade became very active until September, when good rain having generally fallen, prices suddenly dropped, and importation from other parts of India at once fell off. Grain importations on a reduced scale, however, continued beyond the end of the year 1877.

24. The highest bazaar rates for grain mostly occurred in July, August, and September. In a few instances the price rose to 7 or 8 lbs. of rice or other grain for a rupee, but the ordinary highest rates were from 10 lbs. to 12 lbs. the rupee. After October the common millets fell to from 20 to 24 lbs. the rupee, or even more in some districts.

25. With the appearance of seasonable rain also green vegetable food became plentiful, and fish and snails abundant, helping much to lessen the intensity of the food distress.

26. When the common food of a people ranges from four to six times its normal price, and when the poorer classes have a difficulty in providing enough food at ordinary rates, it is very certain that mere subsistence is a task too difficult for those who have no reserves of money or property, and that those least fitted to maintain the struggle for existence must die in large numbers. A humane and thoughtful administration of a famine tract may do incalculable good in helping the population to pass through so terrible an ordeal, but to save an entire population stricken by famine is beyond the power of any Government on earth. If it were possible to get at the people before the pangs of starvation had laid hold of them, the task of keeping them alive and in health would be one of superhuman difficulty; but, as a matter of fact, it is quite beyond the power of any administration to reach

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all the people, and to afford them needful aid, before they are mortally smitten with that most fatal of all diseases—chronic privation of food. This at any rate has been the experience of the Madras famine of 1877, and so far as the truth has been told, has been the experience of every famine that has afflicted the human race.

Prices of food and mortality.

27. There is a very close connection between prices of food and the mortality of a population, and the connection is especially apparent in a country like India where, at the best of times, from twenty to thirty per cent. of the people have a difficulty in finding sufficient food.. Even in London, with all its elaborate municipal and poor law system, and private organizations for charitable relief, we learn that in 1877 Coroners' juries returned verdicts of death from "starvation" or "accelerated by privation" in seventy-one instances, and this in spite of the elaborate and costly machinery for the relief of the suffering poor. If such cases can occur in the heart of the civilized world in times of peace and plenty, what may we expect from twenty to thirty millions of the Indian subjects of the Queen and Empress, who have been suddenly placed in the position of having to pay the equivalent of a rise of from 8*d.* to 3*s.* for the 4 lb. loaf, not for a week or two, but for a long dreary period of fourteen or fifteen months. We may be quite certain that a calamity of this nature must leave a permanent mark on the country, and that the process of depopulation must proceed *pari passu* with the intensity of food distress, notwithstanding all that the skill and wisdom of a Government may devise to ameliorate the hard lot of the famine-wasted poor.

28. The question arises why, in a country where payment in grain is the rule and in money the exception, the laboring agricultural poor should be the first to feel the effects of want of food.

The answer is not far to seek. Employers do, as a rule, feed their people so long as their own stocks hold out, but a succession of bad seasons exhausts the ordinary resources of the ryots, and the time comes when they have to choose between reserving enough grain for the probable wants of their own families, or sharing the food-reserve with their servants. Here the law of self-preservation comes into play, and the servants are left to shift for themselves, on the ground that as the land has yielded no produce there is no share available for the laborer.

The laboring classes attached to the soil do, as a fact, consider themselves entitled to a share of the grain they have raised, and instances have occurred during the late famine, when the servants have resented the sale of grain by their masters, and when the masters tempted by high prices having sold too large a share, the servants in several instances have been known to attack the dealers' carts, and forcibly detain the grain in the villages.

But during the famine period none but wealthy and well-to-do farmers could afford to maintain their laborers; and even the small proprietors were soon reduced to destitution as bad as those who held no land. How they gradually sold and divested themselves of their jewels of silver and gold, and how these articles found their way into the Bombay Mint to be melted into bullion, has already been told by Mr. Heyne. Both laborers and small farmers, and the several artizan classes dependent on them were soon all in the position of having starvation stare them in face, with no refuge or hope of relief, but on the Government works, or in hospital camps.

29. Calculations have been made from time to time as to the number of persons kept alive by imported food; but all these calculations proceed on the assumption that each person has consumed a certain amount of grain, whereas we know from experience that when grain had touched a price, giving only 10 or 12 lbs. for a rupee, it was out of the power of a very considerable number of people to buy at all. If there had been money or means to pay for food, double the quantity of grain actually imported would probably have been required, but an enormous number of people had to eke out their food-deficiencies as best they could, without going through the process of buying. Nature, even in her sterile days, is provident, and thousands upon thousands of the people led a precarious dependence on wild products of the jungles and fields, and for the time being, were practically non-consumers of the imported food that was too dear for them. They pilfered grain when they had the chance, and in the town of Madras alone thousands subsisted by following the rice carts from the beach to the Railway station, and causing the

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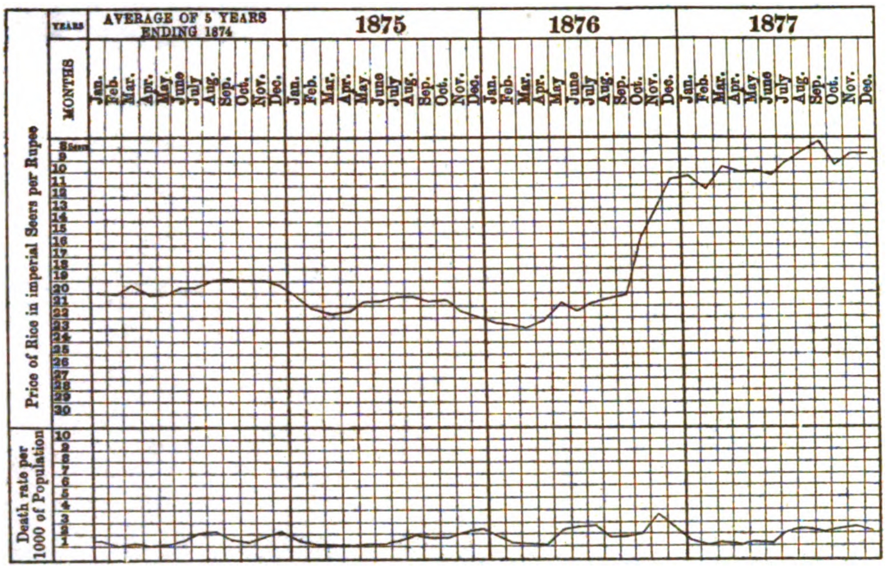
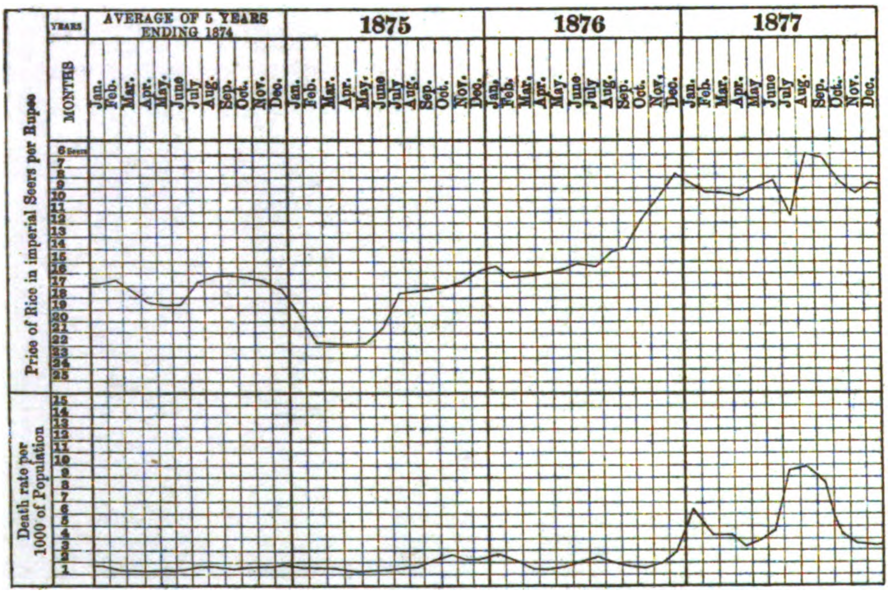
DIAGRAMS SHOWING THE PRICE OF THE STAPLE ARTICLE OF FOOD AND THE DEATH RATE PER MILLE IN THE UNDERMENTIONED DISTRICTS OF THE MADRAS PRESIDENCY FOR 3 YEARS ENDING 1877, COMPARED WITH THE AVERAGE OF 5 YEARS ENDING 1874.

GODAVERY



CHINGLEPUT



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grain bags to leak tiny driblets of their precious contents, while others winnowed the sand of the sea-shore in search of detached grains of rice.

Diagrams showing Prices of food and Death-rate in certain districts.

30. In addition to the table giving the prices of food for an average of five years, and separately for the years 1875, 1876, 1877 for the several revenue districts, I have added diagrams of typical districts showing the correspondence between our death-rates as registered, and the prices of the staple food-grains. Any one interested in such subjects can follow the fluctuations of prices and death-rates. It only needs to be remembered in regard to these diagrams that mortality due to privation follows slowly on advancing prices, and that it continues for some time after the tension of high prices has been relieved.

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Table showing the Average Prices of Food in the Madras Presidency during 1875, 1876 *and* 1877, *compared with the Average of the previous* 5 *Years.*

Second-sort Rice.

Districts.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Average.
GANJAM.													
Average of 5 years.	19·7	20·1	20·4	20·7	20·8	20·0	20·1	19·3	19·3	19·6	20·5	20·6	19·9
1875	23·5	24·2	23·6	23·7	22·3	21·4	21·0	19·0	19·7	20·8	20·1	21·6	21·7
1876	23·0	21·2	20·7	21·0	20·2	20·4	20·4	19·0	20·0	19·9	17·4	18·7	19·7
1877	15·2	15·7	15·1	15·0	13·5	13·7	11·0	10·1	9·0	9·0	9·1	9·7	12·2
VIZAGAPATAM.													
Average of 5 years.	16·2	16·9	18·1	17·8	17·5	16·8	16·7	15·4	16·1	15·9	16·2	16·3	16·6
1875	17·0	18·0	17·9	17·9	17·3	16·8	16·8	16·0	15·9	16·2	16·7	17·0	16·9
1876	17·8	17·0	17·6	16·2	16·7	16·8	16·7	16·8	16·3	15·1	12·9	11·2	15·9
1877	11·0	11·7	11·5	10·7	10·7	10·3	8·8	7·8	7·3	7·7	7·6	8·5	9·4
GODAVERY.													
Average of 5 years.	20·0	20·1	19·4	20·1	20·1	19·7	19·5	19·0	18·9	19·0	19·0	19·3	19·4
1875	20·2	21·3	21·6	21·5	20·6	20·6	20·2	20·2	20·8	20·7	21·6	22·0	20·9
1876	22·3	22·6	22·9	22·2	20·9	21·4	20·9	20·5	20·1	15·7	13·1	10·5	19·4
1877	10·2	11·2	9·7	10·0	9·9	10·3	9·2	8·1	7·4	9·3	8·4	8·4	9·3
KISTNA.													
Average of 5 years.	14·8	15·2	15·5	16·2	16·3	15·4	15·0	14·7	14·8	14·8	14·9	15·6	15·1
1875	18·8	19·9	19·6	19·9	19·7	18·4	18·7	18·5	18·8	19·0	19·5	20·0	19·2
1876	20·4	20·5	20·7	20·4	19·8	19·2	18·3	18·0	17·1	13·7	10·7	8·9	17·3
1877	8·7	10·3	9·0	9·2	9·0	9·1	8·0	7·0	7·1	7·9	7·5	7·6	8·4
NELLORE.													
Average of 5 years.	17·5	17·1	17·0	17·0	16·8	16·7	17·6	17·1	17·2	16·4	17·1	17·4	17·1
1875	15·3	15·7	15·5	15·9	16·6	17·2	17·5	17·0	17·5	17·5	17·7	16·4	16·6
1876	15·9	15·5	15·7	15·4	15·1	14·9	15·0	14·5	13·9	11·7	8·2	6·9	13·7
1877	7·1	8·1	7·2	7·9	7·8	7·8	6·8	5·7	5·8	6·4	6·9	7·5	7·1
CUDDAPAH.													
Average of 5 years.	13·6	13·8	14·0	14·3	14·8	15·0	15·1	15·1	15·0	15·1	15·2	15·2	14·6
1875	19·4	19·7	20·1	20·3	20·7	20·4	20·7	20·4	20·0	19·3	17·8	15·6	19·5
1876	14·8	14·7	14·5	13·7	14·1	13·9	12·4	12·0	11·2	8·7	7·2	6·3	12·0
1877	6·8	7·2	7·9	8·4	7·8	7·4	5·8	5·8	5·6	7·1	7·9	8·5	7·2

Cholum.

Districts.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Average.
GANJAM.													
Average of 5 years.	30·0	32·1	31·4	30·0	29·7	28·7	27·3	26·9	26·7	26·2	24·2	31·8	29·1
1875	29·1	34·8	33·2	29·3	28·2	25·1	22·5	22·5	24·6	23·9	28·2	28·8	27·5
1876	29·3	30·2	27·4	27·3	23·9	25·5	26·4	26·7	26·7	26·7	28·2	16·2	26·2
1877	13·9	21·0	21·0	20·8	18·5	17·9	14·7	14·6	13·9	13·9	13·9	13·9	16·5
VIZAGAPATAM.													
Average of 5 years.	27·2	28·9	30·7	30·5	30·6	27·0	27·5	26·5	27·4	27·8	29·3	29·2	28·7
1875	32·3	33·1	31·1	29·8	30·4	28·4	25·7	24·8	24·0	23·5	21·9	28·1	27·7
1876	27·7	30·3	31·0	30·3	28·4	26·5	27·2	23·0	27·1	25·9	22·7	16·4	26·4
1877	17·4	19·6	19·0	18·4	17·0	16·3	14·0	11·1	10·1	9·4	10·1	13·5	14·7
GODAVERY.													
Average of 5 years.	32·4	26·5	32·4	34·4	33·7	33·0	32·1	32·1	31·7	31·9	31·1	31·9	32·2
1875	36·0	37·4	37·8	37·9	36·4	36·1	34·3	33·6	33·9	34·1	34·2	35·4	35·6
1876	37·6	38·6	39·3	38·8	38·1	37·2	37·1	36·8	37·6	27·3	18·9	13·4	33·4
1877	14·8	17·2	15·7	15·7	14·8	14·9	12·2	7·4	8·9	11·3	12·6	13·0	13·2
KISTNA.													
Average of 5 years.	22·7	22·9	23·8	24·0	23·2	22·3	22·2	21·9	22·8	23·5	22·1	22·7	22·7
1875	28·5	29·0	29·1	27·4	26·3	26·2	24·8	25·7	26·4	26·9	27·9	29·7	27·3
1876	31·5	32·0	31·0	30·3	30·3	30·3	29·7	28·9	28·3	20·0	14·5	11·2	26·5
1877	11·5	12·7	11·5	11·3	11·2	11·2	8·9	8·0	9·0	10·7	11·1	12·4	10·8
NELLORE.													
Average of 5 years.	27·7	27·7	28·7	28·0	27·6	26·9	27·8	27·4	25·9	24·4	27·2	27·1	27·3
1875	25·6	26·0	26·3	27·6	28·4	29·8	29·5	29·1	28·5	28·8	28·4	27·5	28·0
1876	27·3	27·8	27·1	28·1	27·8	27·5	26·7	24·8	23·8	17·6	12·0	8·7	23·3
1877	8·0	8·9	9·4	9·4	9·2	9·4	8·0	6·4	6·8	7·2	7·5	8·8	8·3
CUDDAPAH.													
Average of 5 years.	24·7	24·4	25·1	25·3	25·8	25·2	27·4	27·2	24·6	27·4	25·4	25·8	25·3
1875	28·1	29·7	31·2	31·8	31·3	30·8	30·4	30·8	30·3	30·6	29·3	27·1	30·1
1876	26·5	27·3	25·3	23·6	26·2	25·3	21·9	20·2	17·1	11·8	8·7	7·2	20·1
1877	6·0	8·5	9·5	9·3	8·6	8·3	6·6	6·3	6·7	9·0	10·4	11·5	8·4

Ragi.

Districts.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Average.
GANJAM.													
Average of 5 years.	35·2	34·8	34·1	34·7	33·8	33·4	33·7	32·4	33·5	36·1	37·1	36·7	34·6
1875	40·3	40·8	41·2	40·6	39·3	38·0	37·1	34·3	35·7	40·4	40·3	40·0	39·0
1876	39·6	38·5	37·5	37·3	36·3	35·8	35·6	32·9	37·8	39·5	28·0	16·8	34·6
1877	20·8	22·7	22·8	23·2	21·1	17·0	14·7	13·7	17·7	14·6	15·2	14·8	18·2
VIZAGAPATAM.													
Average of 5 years.	28·4	27·7	29·9	30·2	29·8	28·0	27·1	26·8	28·3	29·7	29·7	29·8	28·6
1875	32·4	32·1	32·2	32·1	32·2	30·2	28·9	27·8	29·1	33·4	32·9	33·6	30·5
1876	31·8	30·0	31·4	31·0	30·2	30·0	27·5	28·3	29·6	29·3	22·8	17·2	28·8
1877	17·5	19·5	18·7	18·0	17·8	16·8	14·6	13·0	11·7	12·1	12·4	13·9	15·5
GODAVERY.													
Average of 5 years.	36·8	36·8	34·9	36·9	36·8	35·4	35·4	34·7	34·6	34·9	34·7	34·0	35·4
1875	36·7	38·3	36·5	38·1	37·2	37·4	37·0	35·7	36·0	35·9	39·2	38·6	37·2
1876	39·6	40·0	39·0	38·4	38·0	38·0	37·3	36·4	39·3	27·9	20·2	14·7	34·1
1877	14·5	16·5	16·8	16·5	15·8	15·6	12·5	10·5	9·5	12·9	14·2	15·5	14·2
KISTNA.													
Average of 5 years.	28·6	29·4	29·3	30·3	31·0	30·2	29·2	27·7	28·0	28·3	27·1	30·1	29·1
1875	35·8	35·4	35·4	34·3	33·8	33·6	32·8	32·6	32·6	32·1	32·1	30·8	34·2
1876	35·3	36·1	36·7	35·9	35·2	35·8	31·2	32·4	31·3	24·2	15·8	11·0	30·1
1877	10·8	14·4	13·5	14·4	13·6	13·1	9·9	8·1	9·6	11·5	11·6	12·2	11·9
NELLORE.													
Average of 5 years.	32·5	31·4	33·5	31·9	32·1	32·1	32·7	32·2	33·8	31·9	31·6	30·8	31·9
1875	27·9	28·3	29·0	29·0	31·5	32·6	31·5	31·0	30·9	31·2	30·9	28·9	30·2
1876	28·6	28·5	28·8	29·9	29·8	29·6	29·3	26·4	24·9	18·8	13·3	8·8	24·7
1877	8·1	9·2	10·6	11·2	10·7	10·6	8·5	7·1	7·0	8·0	8·6	9·2	9·1
CUDDAPAH.													
Average of 5 years.	27·7	27·6	28·2	29·2	29·8	29·0	28·0	28·8	27·7	28·3	28·8	28·5	28·7
1875	31·1	32·1	32·6	33·2	33·8	34·2	32·6	32·3	31·5	32·2	29·4	28·2	31·1
1876	27·7	27·7	27·3	27·6	27·6	26·7	22·7	21·3	17·2	12·0	9·1	7·4	21·1
1877	7·6	9·0	10·0	9·9	8·6	8·6	6·8	6·4	6·8	9·1	10·4	12·0	8·8

Table showing the Average Prices of Food in the Madras Presidency during 1875, 1876 *and* 1877, *compared with the Average of the previous* 5 *Years*—(Continued).

Second-sort Rice.

Districts.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Average.
Bellary.													
Average of 5 years.	13·8	14·2	14·1	14·6	14·8	14·9	14·7	14·6	14·9	14·6	14·5	14·8	14·5
1875	19·3	19·3	19·4	19·7	19·9	19·9	19·2	19·0	18·6	17·8	16·2	14·6	18·7
1876	15·1	15·2	15·0	14·8	14·8	14·5	13·5	12·7	11·1	8·4	6·7	6·9	12·4
1877	6·9	7·2	7·4	8·2	7·1	6·5	5·6	5·3	5·5	6·8	7·8	7·7	6·9
Kurnool.													
Average of 5 years.	13·0	12·8	12·5	13·0	13·1	13·1	13·3	13·2	13·1	13·3	13·5	13·2	13·1
1875	15·8	15·2	15·9	15·9	15·9	16·0	15·7	15·2	15·6	14·9	15·5	15·4	15·6
1876	15·5	15·3	15·2	15·1	15·3	15·0	14·2	13·5	12·1	7·3	6·5	6·3	12·6
1877	6·3	8·0	7·0	7·4	6·6	6·4	5·4	5·3	5·4	7·6	6·9	7·9	6·7
Madras.													
Average of 5 years.	12·9	14·2	13·4	15·6	15·6	15·2	14·9	15·0	14·7	14·8	13·9	14·9	14·4
1875	13·9	14·8	15·1	15·7	15·1	15·0	13·7	13·5	13·7	13·7	13·9	12·8	14·2
1876	12·0	12·1	12·0	11·8	11·7	11·5	11·3	11·4	10·8	9·4	8·1	6·8	10·7
1877	7·7	8·9	9·3	9·7	8·8	8·3	6·9	6·3	6·8	7·7	8·5	8·4	8·1
Chingleput.													
Average of 5 years.	16·9	16·7	17·5	18·4	18·7	18·6	16·9	16·2	16·2	16·4	16·8	17·1	16·8
1875	19·1	21·7	21·8	21·8	21·7	20·5	17·7	17·5	17·3	17·1	16·8	15·9	19·1
1876	15·5	16·4	16·2	16·0	15·9	15·2	15·4	14·1	13·9	11·6	9·8	7·9	14·0
1877	8·8	9·4	9·5	9·6	9·0	8·4	11·3	6·0	6·2	8·4	9·3	8·8	8·7
North Arcot.													
Average of 5 years.	17·6	17·3	17·7	18·2	18·2	18·9	18·1	18·6	18·1	17·8	19·2	18·6	18·0
1875	18·8	19·3	19·1	19·8	19·5	19·5	18·5	17·9	17·7	17·7	16·4	15·0	18·3
1876	15·0	14·6	14·5	14·3	14·5	13·6	13·2	12·7	12·2	9·8	8·4	7·2	12·5
1877	7·4	8·0	8·2	8·7	8·0	7·4	6·3	6·5	5·8	8·0	8·4	8·3	7·6
South Arcot.													
Average of 5 years.	17·0	17·9	18·8	18·9	18·2	18·0	17·5	17·1	17·0	16·9	17·9	17·6	17·7
1875	18·4	20·2	20·3	20·7	19·2	18·3	17·3	16·9	17·3	17·0	18·1	16·7	18·4
1876	15·1	15·4	15·4	15·4	15·4	15·5	14·9	14·5	14·2	12·7	9·7	7·6	13·8
1877	8·3	8·7	9·1	10·0	9·1	8·6	6·8	6·2	5·8	6·8	7·6	8·1	7·9

Cholum.

Districts.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Average.
Bellary.													
Average of 5 years.	28·4	27·5	30·1	29·0	28·7	28·4	26·9	29·2	27·1	29·4	30·5	30·2	28·7
1875	32·6	32·2	31·7	30·2	30·3	28·7	27·6	27·0	25·0	25·2	26·2	25·6	28·5
1876	26·1	25·7	25·6	25·8	25·3	24·6	22·4	20·5	15·5	10·4	7·5	7·5	19·7
1877	7·8	8·4	9·1	8·6	7·5	6·8	6·0	5·8	6·3	9·1	10·8	10·8	8·1
Kurnool.													
Average of 5 years.	25·2	25·5	26·0	25·7	25·8	25·6	25·2	24·4	24·1	24·5	25·7	26·1	25·2
1875	27·5	27·2	27·9	26·9	25·4	24·0	23·4	23·8	22·6	23·8	27·4	26·4	25·5
1876	28·4	29·4	29·1	28·8	28·8	26·8	24·4	21·5	17·7	9·3	7·9	7·0	21·6
1877	7·1	8·1	8·6	8·3	7·8	7·0	6·2	6·0	6·4	8·2	9·5	10·6	7·8
Madras.													
Average of 5 years.	22·6	22·9	21·1	22·9	22·2	21·5	21·8	22·6	22·2	23·1	23·1	25·3	22·1
1875	22·5	22·8	23·4	23·8	23·8	23·6	23·8	23·4	22·7	22·7	22·7	23·1	23·2
1876	20·8	19·6	18·5	16·8	18·0	18·3	18·0	17·8	16·5	12·5	10·9	9·0	16·3
1877	9·3	10·3	11·7	11·1	11·9	10·2	8·7	7·9	7·9	11·4	11·5	11·6	10·3
Chingleput.													
Average of 5 years.	23·7	23·7	23·3	22·7	22·6	22·7	20·9	22·1	23·0	22·5	23·0	24·1	22·4
1875	22·0	22·0	22·1	22·3	22·8	18·4	18·4	18·4	18·4	21·5	21·5	21·5	20·8
1876	17·6	...	...	...	...	20·1	23·5	23·5	22·9	18·6	14·3	8·7	18·6
1877	11·9	10·9	11·5	10·1	10·2	9·6	7·4	7·1	7·3	6·7	11·7	9·1	9·5
North Arcot.													
Average of 5 years.	27·4	29·5	29·9	30·3	29·2	31·9	28·8	30·6	30·9	31·2	31·1	30·0	29·6
1875	25·1	25·9	26·2	26·0	27·2	26·8	25·4	26·1	26·3	27·0	23·5	22·9	25·7
1876	22·6	21·1	21·3	21·6	23·0	20·5	20·7	20·0	16·9	12·8	10·0	8·8	16·6
1877	8·2	8·5	10·0	10·3	9·1	8·3	7·4	6·6	6·7	8·3	9·3	9·5	8·5
South Arcot.													
Average of 5 years.	36·3	39·5	40·6	36·4	34·3	32·8	33·0	31·1	29·1	31·5	32·2	37·5	33·9
1875	35·9	34·7	34·7	37·4	35·3	36·5	34·4	29·8	28·0	29·6	36·5	34·4	33·8
1876	27·7	28·6	25·1	26·1	24·4	24·5	23·9	22·0	22·4	23·0	16·6	10·7	22·8
1877	11·1	11·5	11·5	11·6	10·5	9·7	7·6	6·7	7·4	8·5	9·9	15·8	10·1

Ragi.

Districts.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Average.
Bellary.													
Average of 5 years.	33·7	33·9	33·1	34·7	34·5	35·2	33·9	33·3	33·8	34·3	35·8	36·1	34·3
1875	35·4	34·4	34·6	33·5	32·6	31·4	30·7	29·0	27·7	26·7	26·8	26·9	30·8
1876	27·2	26·9	26·4	26·2	25·4	24·4	22·1	19·4	15·2	10·5	8·3	7·9	19·9
1877	7·8	7·8	9·1	9·0	7·9	7·4	6·4	6·0	7·1	10·7	12·2	12·1	8·6
Kurnool.													
Average of 5 years.	27·4	27·7	27·2	27·9	29·5	28·4	27·5	27·5	26·1	27·1	26·6	27·6	27·6
1875	26·6	26·9	27·4	28·6	27·0	25·1	25·3	25·9	24·7	24·9	22·7	25·1	25·8
1876	26·1	27·4	28·8	28·7	28·1	27·2	26·4	23·0	19·7	10·6	9·0	7·5	21·4
1877	7·7	8·5	8·6	9·1	8·0	7·4	6·4	5·3	6·6	8·8	10·5	12·7	8·3
Madras.													
Average of 5 years.	25·4	27·9	24·2	27·5	27·5	27·1	28·4	28·7	28·4	29·2	28·2	30·7	27·2
1875	25·6	25·8	25·9	24·6	24·3	23·3	22·6	22·9	23·1	22·6	22·6	21·3	23·7
1876	19·9	20·3	18·9	19·3	19·3	18·6	19·3	19·3	17·1	12·8	10·4	7·9	16·9
1877	9·4	10·1	11·1	10·8	10·0	9·6	8·1	7·6	8·1	11·0	11·5	11·0	9·8
Chingleput.													
Average of 5 years.	28·5	28·0	27·9	28·7	28·5	28·5	26·3	26·4	26·6	28·3	28·8	28·6	27·4
1875	26·3	26·7	26·6	26·8	27·2	26·1	24·3	24·7	24·4	25·0	24·9	23·0	25·5
1876	22·7	22·3	22·0	22·4	22·6	21·1	20·5	21·0	20·1	17·0	13·4	9·4	19·5
1877	9·7	10·8	11·2	11·7	10·9	9·9	7·8	6·5	8·3	11·8	12·0	11·3	10·2
North Arcot.													
Average of 5 years.	33·2	32·2	32·2	33·3	33·8	31·5	33·2	33·0	33·2	34·3	36·0	34·7	33·1
1875	30·9	30·3	30·0	30·6	31·0	30·9	29·4	27·6	28·6	29·0	25·5	23·3	28·9
1876	22·5	22·4	23·0	21·9	23·1	21·3	21·5	19·4	12·4	14·6	11·6	8·6	18·4
1877	8·5	9·4	9·7	10·8	9·8	9·1	7·4	6·9	6·9	9·9	10·0	9·4	8·9
South Arcot.													
Average of 5 years.	34·9	35·2	34·8	33·7	32·9	32·1	33·5	32·8	33·1	35·3	36·8	37·1	33·9
1875	34·5	34·3	32·8	31·6	30·2	28·6	26·3	26·3	27·7	31·4	31·7	28·3	30·3
1876	25·0	24·5	23·6	23·3	23·9	24·2	23·3	23·4	24·5	22·6	14·7	10·8	21·9
1877	10·2	10·7	10·8	11·9	10·6	10·0	8·2	7·6	7·9	10·7	11·3	12·6	10·2

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Table showing the Average Prices of Food in the Madras Presidency during 1875, 1876 *and* 1877, *compared with the Average of the previous* 5 *Years*—(Continued).

Second-sort Rice.

Districts.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Average.
Tanjore.													
Average of 5 years.	16·3	16·9	17·3	17·4	16·9	16·8	16·4	16·0	15·7	16·6	16·7	16·0	16·2
1875	14·7	15·9	16·8	16·8	16·5	16·3	15·9	13·5	14·5	14·8	15·3	15·7	15·5
1876	15·5	14·2	14·5	14·7	14·7	14·5	13·5	13·3	13·5	13·4	10·7	8·4	13·4
1877	9·6	9 2	9·7	9·8	8·1	8·7	7·7	6·6	6·2	6·9	8·0	8·1	8·2
Trichinopoly.													
Average of 5 years.	16·4	16·8	17·0	17·0	16·8	16·3	16·9	15·9	15·9	16·1	16·8	16·2	16·4
1875	14·6	15·4	16·0	15·8	15·7	15·5	15·1	14·9	15·0	14·5	15·9	16·4	15·4
1876	16·2	14·3	14·3	13·5	14·4	13·7	12·8	12·8	12·8	13·0	9·1	7·0	12·8
1877	7·7	7·6	7·9	8·3	7·7	7·5	6·2	5·8	5·4	6·3	7·0	7·1	7·0
Madura.													
Average of 5 years.	13·3	13·6	14·0	14·6	14·5	14·0	13·8	14·0	13·6	13·4	13·8	13·8	13·9
1875	13·1	14·8	15·0	15·7	15·9	15·8	15·6	14·6	13·8	13·5	14·2	15·1	14·8
1876	15·3	14·3	14·7	15·0	14·7	14·3	13·0	12·6	12·6	11·9	8·8	7·0	12·9
1877	7·4	7·5	8·2	8·9	8·2	8·1	6·5	6·5	5·8	6·7	7·9	7·5	7·4
Tinnevelly.													
Average of 5 years.	11·8	11·9	12·8	13·2	12·8	12·2	12·1	12·1	12·0	12·3	12·3	12·2	12·3
1875	11·7	13·1	13·3	13·5	13·5	12·7	12·0	11·8	11·9	11·9	12·4	12·7	12·5
1876	13·1	12·3	12·2	12·3	12·3	11·5	10·8	10·5	10·4	11·2	9·8	7·8	11·2
1877	7·7	7·9	9·3	9·0	8·6	8·1	7·1	6·7	6·4	7·8	9·4	9·2	8·1
Coimbatore.													
Average of 5 years.	13·7	13·8	14·1	14·3	13·2	13·9	13·7	13·5	13·5	13·5	13·9	14·1	13·8
1875	14·0	14·6	14·5	14·3	14·7	14·0	13·8	13·8	13·0	12·9	13·7	13·4	13·9
1876	12·9	12·8	12·9	12·7	12·7	12·2	11·9	...	...	...	8·7	7·8	...
1877	7·6	8·0	8·1	8·3	7·9	7·6	6·2	6·2	6·1	8·0	8·6	8·2	7·6
Neilgherries.													
Average of 5 years.	9·6	9·9	9·7	9·8	9·7	9·5	10·1	9·8	10·1	9·5	9·7	9·6	9·7
1875	9·8	10·2	11·0	11·1	10·9	10·4	10·4	10·5	10·3	10·1	9·4	9·7	10·3
1876	10·1	9·8	9·7	10·0	10·4	9·8	9·5	9·1	8·7	7·8	6·4	6·5	9·0
1877	6·7	7·4	7·6	7·5	7·4	6·6	5·5	5·6	5·3	6·0	6·4	7·0	6·6

Cholum.

Districts.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Average.
Tanjore.													
Average of 5 years.	27·8	29·0	26·1	29·6	29·9	27·9	25·3	25·0	26·7	29·0	29·5	30·1	27·9
1875	25·5	23·7	23·5	25·3	26·3	24·6	21·5	21·3	21·2	28·4	28·2	29·2	24·8
1876	27·8	27·0	27·4	26·6	27·3	25·3	24·2	23·2	22·6	24·0	17·2	11·1	23·8
1877	11·7	12·3	12·2	13·7	3·2	10·8	13·9	8·5	9·8	11·3	14·2	12·4	12·0
Trichinopoly.													
Average of 5 years.	32·8	34·7	33·5	34·7	33·4	29·8	26·9	28·1	27·9	29·0	29·7	30·9	30·8
1875	24·5	28·0	28·0	38·3	37·2	37·0	33·2	32·5	32·1	31·7	31·5	31·8	32·1
1876	31·4	32·0	31·6	28·0	34·1	35·1	33·4	34·8	25·7	25·2	16·7	10·6	28·2
1877	13·8	14·8	15·2	14·7	12·8	13·0	12·6	7·3	...	...	...	20·8	...
Madura.													
Average of 5 years.	31·6	31·2	31·6	32·3	31·7	30·6	31·2	30·4	30·6	30·0	28·0	31·7	30·8
1875	32·1	36·9	37·3	30·6	34·0	35·6	34·9	31·0	29·5	28·8	30·7	34·9	33·0
1876	35·9	33·2	34·9	35·6	35·1	32·4	29·9	29·1	27·2	22·5	13·9	13·6	28·6
1877	13·6	13·2	12·5	12·5	12·4	10·5	8·8	7·8	7·4	8·4	15·9	17·3	11·7
Tinnevelly.													
Average of 5 years.	22·4	21·8	23·3	26·6	24·9	23·5	22·8	22·0	22·5	23·2	22·1	22·1	23·1
1875	19·7	20·2	19·9	22·4	22·1	24·6	23·8	23·7	23·6	23·8	24·8	25·5	22·8
1876	26·2	24·2	23·5	23·8	24·4	22·6	20·3	19·3	19·7	20·6	16·1	11·1	21·0
1877	12·9	13·6	10·9	10·1	11·2	11·8	9·1	8·7	8·8	8·9	10·7	12·2	10·7
Coimbatore.													
Average of 5 years.	22·4	22·8	23·7	23·1	22·6	23·1	23·2	24·3	23·4	23·2	24·4	24·1	23·3
1875	21·7	21·8	22·6	21·7	22·9	23·2	23·8	23·6	21·8	23·6	21·2	22·6	22·5
1876	20·9	21·2	21·1	20·2	20·3	20·0	19·3	...	...	...	12·2	8·3	...
1877	9·2	9·9	10·3	9·6	9·0	8·6	6·8	7·4	7·1	10·4	11·0	11·1	9·2
Neilgherries.													
Average of 5 years.	17·2	16·2	17·2	16·7	15·2	16·4	16·8	17·7	18·4	18·7	18·8	19·5	17·3
1875	17·5	16·7	17·1	16·9	15·5	16·5	17·6	16·3	16·4	15·5	15·8	15·2	16·4
1876	14·1	14·9	15·3	14·0	14·2	14·8	15·0	15·7	14·4	12·5	8·8	7·4	13·4
1877	8·2	8·8	8·4	7·8	7·7	7·6	6·6	5·8	6·0	7·0	7·0	8·4	7·4

Ragi.

Districts.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Average.
Tanjore.													
Average of 5 years.	34·5	34·6	35·1	33·8	32·8	31·5	30·4	30·4	30·3	35·5	35·0	35·5	33·2
1875	29·1	27·8	29·4	28·2	28·7	28·6	27·5	26·9	27·9	31·2	33·6	31·5	29·2
1876	29·8	29·0	28·1	28·8	25·8	26·8	26·4	25·9	26·4	24·3	16·6	11·3	24·9
1877	11·3	12·9	12·3	13·2	12·3	11·4	8·5	9·1	10·1	12·2	13·5	13·7	10·9
Trichinopoly.													
Average of 5 years.	36·8	35·8	34·3	33·7	32·6	31·2	33·2	30·2	31·9	34·6	36·4	36·6	33·5
1875	30·1	30·7	30·7	30·7	30·1	29·3	28·5	27·7	27·6	29·6	30·4	30·4	29·6
1876	29·6	27·0	25·7	26·2	26·3	27·0	25·6	24·3	24·0	22·2	15·7	10·4	23·7
1877	11·1	11·7	11·3	11·3	10·6	10·7	8·7	7·3	8·1	10·6	11·3	13·0	10·6
Madura.													
Average of 5 years.	30·0	31·5	30·9	32·3	32·3	31·1	29·7	29·6	31·2	30·5	30·4	32·9	30·9
1875	28·6	30·8	31·0	30·7	32·1	32·0	31·2	30·8	29·7	29·6	32·5	33·6	31·1
1876	34·2	32·2	30·4	31·2	30·8	29·0	27·0	26·5	26·3	23·5	14·4	10·8	26·3
1877	12·3	8·8	10·5	10·6	10·1	9·8	9·0	8·3	8·2	9·4	10·8	14·1	10·2
Tinnevelly.													
Average of 5 years.	25·6	25·8	25·7	25·9	25·3	24·0	23·2	23·4	24·1	24·9	23·6	26·2	24·7
1875	26·7	28·4	29·2	28·5	26·8	26·7	25·6	25·1	25·0	25·1	26·1	28·0	26·7
1876	29·3	27·1	26·2	25·8	25·5	24·5	22·6	22·1	21·8	22·5	16·3	11·9	23·0
1877	12·3	11·7	10·6	11·0	10·4	9·9	8·6	8·2	8·1	7·9	12·8	20·5	11·0
Coimbatore.													
Average of 5 years.	30·6	30·5	31·0	30·4	28·5	29·6	29·0	29·3	29·8	29·5	31·4	32·7	30·2
1875	29·0	28·7	28·5	29·3	28·6	27·7	28·0	27·6	25·4	24·6	25·7	25·1	27·3
1876	24·0	24·3	23·8	22·9	23·6	22·6	21·6	...	...	...	14·6	10·7	...
1877	10·2	10·5	10·3	9·9	9·5	8·8	7·8	7·0	7·8	11·0	12·8	14·2	9·9
Neilgherries.													
Average of 5 years.	21·5	20·4	20·1	20·3	19·9	19·9	20·3	20·5	20·7	20·6	20·7	22·0	20·6
1875	18·9	18·8	19·2	18·8	18·7	18·1	18·1	18·3	17·2	16·2	16·1	15·7	16·9
1876	15·8	15·5	15·6	16·3	16·6	16·4	14·2	14·9	13·9	12·2	10·0	8·4	14·1
1877	8·4	8·7	8·8	8·7	8·7	8·0	6·6	6·4	6·7	7·5	8·3	9·2	8·0

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Table showing the Average Prices of Food in the Madras Presidency during 1875, 1876 *and* 1877, *compared with the Average of the previous* 5 *Years*—(Continued).

Districts.	Second-sort Rice.												
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Average.
SALEM.													
Average of 5 years.	16·7	15·2	16·5	16·5	16·6	16·1	15·6	15·6	15·8	16·4	17·0	17·4	16·4
1875	16·5	16·4	16·4	16·7	16·8	16·2	15·9	15·4	15·1	15·0	15·0	13·8	15·2
1876	13·6	14·1	13·2	13·0	13·2	12·9	12·4	12·0	11·3	10·1	7·9	6·9	11·7
1877	7·0	7·4	7·3	7·9	7·3	7·0	5·8	5·6	5·4	7·7	7·8	8·6	7·1
SOUTH CANARA.													
Average of 5 years.	14·7	15·0	15·0	14·8	14·5	14·1	13·8	14·0	14·0	13·9	14·3	14·4	14·3
1875	14·1	14·6	15·4	15·2	14·9	13·8	13·7	13·8	13·8	14·0	14·5	14·8	14·4
1876	14·7	14·3	13·8	13·0	12·5	12·4	12·5	12·4	12·7	12·5	10·7	10·6	12·6
1877	9·3	9·5	10·1	10·7	9·9	8·6	8·3	7·7	7·7	8·5	9·0	10·8	9·2
MALABAR.													
Average of 5 years.	13·4	13·3	13·6	13·2	13·0	13·3	13·0	13·1	13·6	13·9	13·7	13·5	13·4
1875	13·0	12·7	13·1	13·5	13·2	13·0	12·7	12·5	13·0	13·6	13·8	13·7	13·2
1876	13·6	10·8	13·0	12·8	12·5	12·0	11·3	11·3	11·9	11·8	10·8	9·8	11·8
1877	9·1	9·4	9·7	10·0	9·5	8·7	7·8	7·5	7·8	9·9	10·1	10·6	9·2

Districts.	Cholum.												
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Average.
SALEM.													
Average of 5 years.	34·8	32·3	31·2	31·7	30·9	31·7	31·5	30·7	30·8	32·7	34·0	33·4	32·0
1875	27·0	26·1	26·7	28·2	27·2	28·0	28·2	28·0	27·1	25·3	23·9	22·1	26·5
1876	22·1	21·6	21·0	19·9	21·7	20·7	19·3	18·9	17·5	14·4	11·4	8·3	18·1
1877	8·2	9·3	8·9	9·4	8·4	8·3	7·9	6·5	6·3	8·3	8·8	9·0	8·3
SOUTH CANARA.													
Average of 5 years.	...	...	...	...	...	...	...	...	...	...	...	...	...
1875	...	...	...	...	...	...	...	...	...	...	...	...	...
1876	...	...	...	...	...	...	...	...	...	...	...	...	...
1877	...	...	...	...	...	...	...	...	...	...	...	...	...
MALABAR.													
Average of 5 years.	...	21·8	18·2	19·3	23·5	21·3	...	...	33·8	...	...	...	27·3
1875	...	...	...	...	...	...	...	...	...	...	...	...	...
1876	...	...	...	...	...	...	...	...	...	...	...	...	...
1877	...	9·7	...	...	...	...	...	...	...	...	...	...	...

Districts.	Ragi.												
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Average.
SALEM.													
Average of 5 years.	37·8	36·7	36·3	37·4	36·6	37·6	35·3	36·0	37·5	39·0	40·0	39·3	37·4
1875	30·1	30·1	30·4	31·5	31·1	30·4	30·0	29·6	28·8	27·8	26·9	23·2	29·1
1876	21·7	21·4	22·1	22·8	23·5	22·8	20·7	20·1	18·3	14·6	11·3	8·7	19·0
1877	8·4	9·4	9·0	9·0	8·5	8·3	9·6	6·2	6·3	9·1	9·9	10·0	8·7
SOUTH CANARA.													
Average of 5 years.	26·3	26·5	23·8	24·3	23·7	21·9	21·9	21·8	22·4	22·3	24·4	25·5	23·6
1875	24·2	23·4	22·8	22·4	21·2	20·9	19·7	19·6	19·7	20·4	20·4	19·8	21·2
1876	18·9	18·5	18·5	17·4	17·7	17·5	16·0	16·0	15·0	16·5	12·7	11·5	16·3
1877	10·6	10·7	10·9	10·9	11·0	9·8	9·6	9·2	9·2	10·0	11·7	12·4	10·5
MALABAR.													
Average of 5 years.	26·1	24·5	27·1	25·6	25·6	20·9	25·1	25·7	25·6	26·1	26·4	26·9	25·8
1875	24·4	23·4	22·6	21·4	20·1	22·0	21·6	21·9	22·4	24·6	24·0	23·0	26·6
1876	21·3	19·2	17·5	18·2	19·5	18·9	17·7	18·5	18·5	14·9	12·0	11·5	17·3
1877	11·0	11·4	12·0	11·8	11·0	9·4	9·5	8·6	9·0	9·7	11·5	13·3	10·7

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SECTION II.

EUROPEAN ARMY.

Strength of British Troops by Adjutant-General's Returns.

31. The strength of the British troops of the Madras Army on the 1st January 1877 was, according to the Adjutant-General's returns, 11,130, and the additions during the year by recruiting, drafts from England, transfers from other Presidencies, and joined from desertion 1,525. During the year the total decrease by time-expired men, invaliding, deaths, desertions, discharges, transfers to unattached list, and embarkations for England was 1,597, leaving the strength of the army on the 1st January 1878 at 11,058.

Strength, sickness, and mortality by Stational Medical Returns.

32. But the returns of the military strength and the medical strength never quite correspond. The latter is taken from the weekly regimental returns of sick, and is founded on the daily strength present at the several stations or marching, and these figures show that the mean annual strength of the British Army present in the Madras command, as computed from the weekly regimental returns of sick, was 10,782; that the total of hospital admissions was 12,639, and the average daily sick during the year 633, while the deaths in and out of hospital during the year numbered 186.* The Adjutant-General's returns show 182 deaths amongst "effectives," and 11 amongst "unattached," but as regards the latter, the mortality is not shown in the medical returns, inasmuch as the unattached men are not borne on the strength of the effective troops. The difference between the deaths shown in the Adjutant-General's returns of effectives and the medical returns is only six.†

Differences in the Statistical Tables explained.

33. Comments have been made from time to time in regard to the differences in the figures prepared by Dr. Bryden and those compiled in this office, and it has been explained that Dr. Bryden's figures include a detachment of a Madras regiment in a Bengal sanitarium (Puchmarri), the returns of which do not reach Madras, and also invalids of the Madras Army halting in the Bombay Presidency up to the time of embarkation at Bombay. The differences in themselves are always slight, but such as they are they must always cause minute variations in the ratios and proportions of sickness and strength, and as the mean strength is slightly altered also by the inclusion of these troops outside of the Madras Presidency, there is another source of minor variation in the figures; but the chief intention of this section of the sanitary report is to show the sickness and mortality of the troops occupying the several *stations* of the Madras command, and the causes affecting the sanitary condition of the several stations, and to preserve in fact, as correctly as possible, a continuous record of local disease causes from year to year.

34. A statistical record of sickness and mortality for the whole Indian Army is undoubtedly of great value, but it would seem to be obvious that for any practical deductions from such statistics a knowledge of local details is required. In illustration I may state that while in my Annual Sanitary Report for 1876 I show an outbreak of cholera amongst a newly arrived detachment at Wellington in April 1876; in the return prepared by the Statistical officer with the Government of India the cases and deaths from cholera occurring in Wellington are shown under the head of "Troops Marching," the fact being that only one death occurred while the detachment was proceeding from Mettapolliem to Wellington, while all the other cases of deaths actually occurred after the troops had arrived at Wellington. The matter of local interest was that by encamping and isolating the cholera-infected detachment the disease did not immediately spread to the troops already assembled

* According to the Surgeon-General's returns the total is 188. Two other deaths occurred elsewhere in Ongole and Nellore, which were not included in the regimental stational returns.

† It has been ascertained that the practice in the Adjutant-General's Office is to record deaths according to the date of report, and not according to the actual date of death. A death occurring in December of one year, may thus be included in the returns of the following year. This practice differs from the procedure in regard to medical returns, which embrace all casualties occurring within a calendar year.

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at the depôt, but the mode of compiling the statistics of the Imperial Army fails to show the actual circumstances. While, therefore, there is no intention of contrasting the station statistics with those prepared by the Sanitary Commissioner with the Government of India, I shall avail myself freely of the permission of the Secretary of State for India in despatch No. 6, dated 31st May 1877, to continue to make the stational army statistics the leading feature in the sections of the Annual Sanitary Report devoted to military subjects.

General remarks on climate, &c.

35. The year 1877 has been a very remarkable one in Southern India. Famine and pestilence have been widely spread, causing terrible mortality and distress amongst the Native population, but to whatever influences the European Army may have been subjected, the food scarcity has not pressed upon the men, and we shall have therefore to contrast the condition of the well-fed, and well-cared-for, European troops with the surrounding Native populations affected by famine and epidemic disease.

36. Let it be understood that in regard to peculiarities of climate and causes favoring epidemic disease, the British Army in Southern India has been exposed to evil influences just in the same degree as the Native population. The intense solar heat of the early months of the year pervaded the European barrack as it did the Native hut. In Madras, Bangalore, Bellary, Trichinopoly, and Secunderabad the British soldier could not take his walks abroad without encountering the victims of small-pox and cholera, and running the risk of personal infection; but we shall see how little these circumstances have affected a body of men, provided with wholesome food and drink, and whose domestic sanitation was thoughtfully cared for by the State.

37. As a matter of fact, the mortality of British troops, while on the whole slightly in excess of the average of the previous three years, has been considerably less than the mean mortality of the previous eight years, while the total deaths from cholera in the Madras Army was 19 against an average of 18 in the eight previous years. But as six of these deaths occurred in British Burmah, a non-famine district, it cannot be said that the cholera mortality of the British troops was unduly influenced by the sickly and diseased crowds of Natives flocking into the large Military Cantonments of the Presidency. In Bellary, the very centre of the famine, the mortality of the British troops was less than the average of the preceding eleven years. In Bangalore, the centre of another distressed district, the mortality was slightly above the average. At St. Thomas' Mount, Secunderabad and Trichinopoly, all centres of general distress and epidemic pestilence, the mortality of British troops was below the average, while at Madras and the Wellington Depôt the deaths in the year exceeded the average.

Stational sickness and mortality.

38. The mean strength of the several bodies of British troops occupying the 19 stations of the Madras Army, including those marching, was 10,782, and the number admitted into hospital 12,639. The average daily sick was 633, and the deaths 186. Of the latter 24 occurred out of hospital.

39. The ratios of admissions, daily sick, mortality and invaliding were as follows:—

Admissions	... ...		1,172·2	per mille.
Daily sick	... ...		58·7	,,
Deaths ...	In hospital	15·02	17·2	,,
	Out of hospital	2·2		
Invalided.*	For discharge	10·2	46·2	,,
	For change of climate ...	36·03		

Comparison with former years.

40. These figures are contrasted in the following table with the results of former years from 1860 to 1876:—

* Ratios calculated on strength of whole army.

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Years.	Admitted.	Daily Sick.	Died in and out of Hospital.	Invalided	
				Change of Climate.	For Discharge.
1860	1448·5	59·9	20·9	49·6	8·1
1861	1254·4	57·6	14·8	22·2	13·3
1862	1295·4	62·09	18·5	18·7	9·5
1863	1254·6	55·7	19·4	28·5	11·5
1864	1538·4	65·5	20·5	51·03	14·0
1865	1450·2	62·7	23·3	33·9	4·9
1866	1490·5	69·1	22·2	46·1	10·5
1867	1386·8	61·8	19·9	44·1	10·5
1868	1399·4	62·4	20·6	52·8	9·5
1869	1328·6	62·08	23·2	47·4	8·2
1870	1481·5	63·6	19·7	70·4	6·6
1871	1211·5	56·2	19·1	29·7	12·5
1872	1352·3	59·7	19·2	26·8	11·2
1873	1270·8	59·3	18·5	50·6	12·7
1874	1141·2	57·6	13·4	29·5	8·3
1875	1096·3	56·9	14·8	60·8	15·5
1876	1132·9	55·2	16·07	81·9	10·9
1877	1172·2	58·7	17·2	36·03	10·2

PRINCIPAL DISEASES.

Fevers.

1872	2,980
1873	2,672
1874	2,108
1875	2,177
1876	2,178

41. The total number of admissions from all varieties of fevers was 2,281. The numbers for each of the previous five years are shown in the margin.

Enteric Fever.

42. Of late years there has been a tendency to enter all, or nearly all, the mortality from fever as "enteric" or typhoid, and it has been assumed that enteric fever has been on the increase in India, because we hear so much more of it in official returns.

Thus, in the returns of the past year of 24 deaths from fevers in the British Army, 22 are returned as "enteric," one as remittent and one as "continued" fever. But when we come to examine the number of admissions of the different types of fever, we find only 64 admissions of typhoid with 22 deaths, 1,444 of continued fevers with one death, 758 of intermittent fevers with no death, and 15 of remittent fever with one death. It is quite clear from these figures, and from the remarks of medical officers in their weekly returns, that the diagnosis between "enteric" and "continued" fevers is more a question of the gravity of the individual case than of difference of symptoms. Practically in the army returns all bad cases are now classified as "enteric" fever, while the milder forms of the same disease are classified as "continued" fever. Hence of late years army statistics have been showing a reduced mortality under "continued," and a vastly increased death-rate from "enteric" fever. If we compare death-rates from "fevers" generally of troops in recent years with the Indian fever statistics of a bye-gone period, we shall find that there has been no increase in aggregate mortality to strength, and that the only very considerable difference is the yearly increasing tendency to write down every fatal case of fever as "enteric."

I do not in the least question the pathological resemblances of Indian continued fevers to those found in typhoid fever in other countries, but I do not think that we tend to improve our knowledge of the causation of diseases by classifying only the bad cases as "enteric" and the milder forms as "continued." Judging from our army returns "enteric" fever is a very fatal disease in India, but if it be the fact that a vast number of fever admissions are entered as "continued" fever and that the headings of the returns of the graver cases of this description are frequently changed during the progress of the cases to "enteric" fever, it would appear preferable to discard altogether the term "continued" fever in army returns, and to describe all these continued fevers as enteric or typhoid.

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43. The following table will show how, by classifying all the severer cases of fever as typhoid, the old common "continued" fever has apparently lost its severity :—

Years.	Typhoid Fever.		Continued Fever.		Remittent Fever.		Intermittent Fever.		Total Fevers.	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
1868	9	6	462	3	168	4	1,259	1	1,898	14
1869	41	11	850	3	225	11	1,065	...	2,181	25
1870	44	14	737	1	51	7	3,989	...	4,821	22
1871	45	15	686	4	143	6	947	...	1,821	25
1872	79	26	1,499	5	79	3	1,823	...	2,980	34
1873	52	10	1,114	3	89	4	1,417	...	2,672	17
1874	34	12	1,321	1	43	...	710	...	2,108	13
1875	23	7	1,315	2	37	2	802	...	2,177	11
1876	51	21	1,508	4	33	1	586	...	2,178	26
1877	64	22	1,444	1	15	1	758	...	2,281	24

Diagnosis of Enteric Fever.

44. There is a practical point in reference to this matter which may be briefly alluded to. Typhoid fever is a disease often obscure and ill-defined in its early stages. A man may feel out of sorts, and have only an idea that he is not quite right, and suddenly serious symptoms of bowel lesion may set in, while the patient and doctor may be thinking the case only one of "common continued" fever, and taking less precautions than would be adopted if the disease was recognized as "enteric" from the beginning. For this reason it seems expedient to limit the use of the term "continued" fever, and to accept the fact that most of the fevers of this country that are prolonged beyond one week, showing variations in morning and evening temperature of the body, are probably connected with morbid action of the glandular structures of the small intestines.

45. A great many of such cases run a mild course and terminate in recovery, but if the "enteric" character of the disease was more generally recognised, early precautions in the way of diet, rest, and treatment would be adopted, and it is possible the mortality might be lessened.

Fevers diminishing or otherwise.

46. The question naturally arises whether there is any evidence to show that the febrile class of diseases in India is diminishing in frequency and fatality, since more attention has been paid to the sanitary surroundings of European troops. Are we, in fact, advancing or retrograding in regard to the means of protecting our soldiers from diseases of this class? I have obtained from the Surgeon-General, Indian Medical Department, some figures relating to the sickness and mortality of the European Army from 1845 to 1859-60 which admit of comparison with the results of the last eleven years.

The old tables of fever mortality have been grouped in five-year periods. The first period from 1845 to 1849 shows a fever mortality of 14 per thousand, the second period from 1850 to 1855 15·5, and the third period from 1855 to 1860 19·4 per mille. The latter period includes the time of the Indian mutinies, and the exposure of a large portion of the troops to the vicissitudes of field service.

But when we come to the two quinquennial periods 1868 to 1872, and 1873 to 1877, we find a steady decrease in fever mortality to strength. In the first period the mortality was 11·3 per mille to strength, and in the second 8·2, and this decrease, be it observed, has been going on during the time that medical officers have been entering their worst cases of continued fever as "enteric." Whatever the true nature of the Indian continued fevers may be, (and the subject I am glad to say is now a matter of special enquiry by Surgeon-General C. A. Gordon, C.B., Principal Medical Officer in Madras) it is quite clear from the evidence now furnished that there has not only been a steady decrease in mortality from fever of recent years, but that there are fewer cases of fever presenting for treatment in the British army. A decrease in the yearly admission rate from 336·1 per mille to 232·2 per mille in the last ten years is fair evidence that the increasing attention to the sanitary welfare of British troops has not been without effect.

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Sickness and Mortality from Fevers among European Troops in the Madras Presidency from 1845 *to* 1859-60, *and from* 1868 *to* 1877, *arranged in Quinquennial Periods.*

—		Average Strength.	Total Treated from Fevers.	Total Deaths from Fevers.	Ratio per 1,000 of Strength to Treated.	Ratio per 1,000 of Strength to Deaths.
By Surgeon-General's Returns, Indian Medical Department.	1845 to 1849 ...	10,865	15,131	153	1392·6	14·08
	1850-51 to 1854-55.	8,947	14,869	139	1661·8	15·5
	1855-56 to 1859-60.	11,382	22,507	221	1977·4	19·4
			Total Admissions into Hospital from fevers.	Total Deaths from fevers.	Ratio per 1,000 of Strength to Admissions.	Ratio per 1,000 of Strength to Deaths.
By Sanitary Commissioner's Returns	1868 to 1872 ...	10,619	13,701	120	1290·2	11·3
	1873 to 1877 ...	11,059	11,416	91	1032·2	8·2

Small-pox.

47. Five cases of small-pox are recorded, viz., one in each of the following stations, Bangalore, Kamptee, St. Thomas' Mount, Secunderabad, and Tonghoo. All these cases recovered. In connection with this subject it must be noted that small-pox has been particularly prevalent and fatal throughout the native communities of South India, and considering the wide-spread prevalence of the disease, it speaks well for the condition of the British troops in regard to the protective influences of vaccination, that so few cases of the disease appeared in the Army.

Cholera.

48. In all the years I have been acquainted with India, nearly a quarter of a century, I have never known cholera so widely distributed and fatal to the Native population as in the early months of 1877. Altogether amongst British troops 35 cases and 19 deaths are recorded in the hospital statistics of the year, and no deaths occurred out of hospital. Cholera cases occurred in eight of the nineteen stations occupied by British troops, viz., at Secunderabad (7 cases), Bangalore (5), Bellary (2), Madras (3), Poonamallee (2), St. Thomas' Mount (1), Thayetmyo, British Burmah, (10), and Wellington (2). These were all the cases amongst the troops. Others occurred amongst European women and children which will be noticed hereafter. It must be remembered that in Bangalore, Bellary, Madras, and Secunderabad the famine brought a vast number of wandering poor into these centres of population, and that for months together the cholera mortality amongst the famine-stricken poor was excessively high. Practically, any attempt to keep the British troops in cantonments isolated was useless, and with cholera all around them the wonder is that more men did not suffer. It speaks well for the hygienic conditions of the several European communities that the cholera epidemic of 1877 passed over them so lightly.

49. At Secunderabad an outbreak of cholera occurred in H. M.'s 12th Lancers under the following circumstances: The regiment disembarked at Bombay on the 1st February, and arrived at Secunderabad from Poona on the 4th and 5th idem. On arrival the regiment was very healthy. On the 6th February five men of the regiment were attacked with diarrhœa and all these cases passed into cholera before the evening. Two of the five men died. In the following week several cases of "diarrhœa" occurred in the regiment, but no further admissions from cholera.

50. In the eleventh week of the quarter (March) a man of H. M.'s 44th Regiment, just arrived from England, was seized with cholera and died. The weekly report states, "No other case has since occurred, nor is diarrhœa prevalent in the regiment."

51. Now, although cholera was known to be prevailing in the bazaars and neighborhood of Secunderabad, it would seem that the 12th Lancers probably contracted the disease while *en route* to the station. No details are given in regard to the sanitary condition of the halting stations between Bombay and Secunderabad

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or of the food and water used, but it is known that cholera was widely spread over the Deccan at this particular time.

52. At Bangalore the cholera cases were occasional only, and the same at Madras, but all occurred in the early months of the year. In both these stations the pestilence was most severe amongst the native residents and famine wanderers seeking food and relief.

The cholera at Thayetmyo.

53. At Thayetmyo, in British Burmah, there was a distinct outbreak of cholera in the month of September, a very unusual period for cholera to appear in this locality. Amongst the troops there were 10 cases and 6 deaths.

54. From the weekly reports I notice that 2 cases of cholera occurred in a party of invalids proceeding from Tonghoo to Rangoon, down the Sitang river on the 25th and 26th of *June*. In *July* cholera was reported to be in the town of Rangoon. In *August* the Medical Officer of H. M.'s 89th Regiment at Thayetmyo reports 13 cases and 6 deaths in the bazaars of the station. In the seventh week of the third quarter 4 deaths are reported. In the eighth week (end of August) no reports of cholera had been received.

On the 8th September a lascar of the Royal Artillery was admitted into hospital with cholera, and regarding his history it would appear that he had been drinking in the bazaars, but no direct communication could be traced between this man and any cholera case in the town. The second case occurring was that of a Bombardier of the Artillery, admitted on the 14th September who died on the 16th. This man had been in communication with the lascar previously mentioned, two days before the latter died.

On the 15th September two women visited the Bombardier in hospital, without permission, viz., Mrs. Roberts and Mrs. Roscoe. On the 18th Mrs. Roberts' child was brought to hospital with cholera. On the 17th this same child had been dining with the Quartermaster Sergeant, and playing with Jones' children living next door. Mrs. Jones had charge of an orphan, Sibson, four years old, a delicate child and a great favorite with the other children. The child Sibson was seized with cholera also on the 18th and taken to hospital, where there was a woman of the 89th Regiment and four children detained for the day. These children were playing in close proximity to the child Sibson and to the cholera discharges, but were very soon sent home to their quarters. About 10 P.M. on that night, the 18th instant, one of these four children was admitted for cholera and died. No other case occurred in that family. On the 14th two children of the Commissariat Sergeant, who lived a mile away from the barracks and who had had no communication with either of the two cases of the 18th and 14th, were seized, and another on the 15th.

A woman was in hospital expecting her confinement when the child Sibson was admitted. She visited the child while it was treated in another ward, and four days after she got cholera and died.

On the 18th September an Artillery Driver of intemperate habits was admitted very drunk, saying that he had cholera. He was put into a ward next to the one in which the Bombardier had died on the 16th, but which had been fumigated and was then closed. He was seen the same evening and found by the Medical Officer to be passing healthy stools. On the 19th he was well, but detained in hospital for observation. On the 20th he was actually seized with cholera. But in regard to this man it was ascertained that he came from the same barrack-room as the Bombardier who died on the 16th, occupying the bed next but one. Two children of Mrs. Jones, guardian of the child Sibson, were admitted, one on the 20th and one on the 21st, and two other children of the same family one on the 25th and one on the 24th.

Mrs. Philson, one of the women who visited the Bombardier on the 15th, was admitted with cholera on the 26th, and a child of hers had died of cholera on the 18th.

55. It is remarkable in connection with this outbreak of cholera to note the number of cases that occurred amongst persons, or their near relatives, coming in contact with the *hospital*. Thus, of all the cases recorded, except those of the Commissariat Sergeant's family, there had been communication, direct or indirect, with the Bombardier who died on the 16th.

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56. In the following cases of the 89th Regiment the communication was also clear. On the 22nd September a Private of the 89th Regiment, who was in the habit of visiting the hospital to see the Schoolmaster of the Regiment, was attacked and died. On the same day a patient in hospital under treatment for gonorrhœa was attacked and died on the next day.

On the 24th the regular hospital orderly was seized with cholera, and on the 25th two orderlies in attendance on a case of hepatic abscess were attacked.

57. As the disease showed such an evident tendency to cling to the hospital, the building was vacated on the 24th, but the two cases last mentioned had been residing for some days in the hospital, and apparently got their infection there, though they did not show signs of the disease until after the patient they were attending on had been moved to camp.

58. These were the last cases in the 89th Regiment, but cases occurred amongst the Royal Artillery until 3rd of October. Soon after the outbreak the families of the infected lines were moved across the river, and no cases subsequently occurred. A similar result followed the vacation of the Artillery barracks on the 3rd October.

59. The local reporters, Surgeon-Majors Cogan and Surgeon Kingston, lay some stress upon the fact that a woman and child of the battery of Artillery had died of cholera in February at Bangalore, and that the first cases had occurred amongst families who had purchased some of the deceased woman's wardrobe; but in regard to this possible mode of communication it is necessary to record the fact that there is evidence of epidemic cholera in the civil station of Thayetmyo for a period of six weeks before the European community was affected. Also that cholera was prevailing at the same time at Prome and other towns and villages on the Irawaddi river, and there seems to be no reason for supposing that the fomites of cholera had been locked up for many months in a box of clothes.

60. It seems that on the 6th September a very rapid rise in the river flooded the lower parts of the cantonment, and that for some days after a sickening and offensive smell arose from the silt left by the retreating waters. Whether this inundation had any influence on the outbreak it is impossible to say, but there can, I think, be no question of the facts of the localization of cholera in the hospital, and of the disease being prevalent in the town for five or six weeks before the Europeans were attacked. The removal of the inhabitants from infected localities of the hospital, married quarters, and artillery barracks seemed to have been efficacious in preventing further spread of the disease.

61. In my letter, No. 270-F, of 15th March 1875, paragraph 17, I recommended that as regards Thayetmyo it appeared prudent not to await an actual outbreak in barracks when cholera was known to be present in the town, but to occupy the bamboo huts across the river as a precautionary measure. This advice was not followed during the late epidemic, but considering how fatally cholera always attacks the European troops at Thayetmyo, I am still of opinion that this is the best course to pursue, viz., to temporarily vacate the locality which experience has shown us is, in every epidemic, liable to attack.

Dysentery.

62. There were 809 admissions from dysentery with 20 deaths in the whole army.

Hepatitis.

63. Of hepatic diseases 665 admissions and 30 deaths; the mortality from both these diseases being much below the mean of the previous ten years.

Dysentery and Hepatitis.

64. In despatch No. 11, dated 19th July 1877,* the Secretary of State for India calls attention to the apparent increase of these diseases in the Madras Command, and suggests that a particular inquiry should be instituted in the case of all such stations as are specially affected by them.

* G.O., No. 1,117, dated 20th August 1877, R. D.

I requested Dr. Gordon, the Principal Medical Officer of British Troops, to be so good as to favor me with his views on this portion of the despatch, and the accompanying reply seems to show that there are no local conditions of a specific and tangible nature to account for the increase in particular years of dysentery and hepatic diseases.

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From the Surgeon-General, British Forces, to the Sanitary Commissioner for Madras, No. 1,294, *dated* 16*th April* 1878.

Adverting to your letter, No. 247, dated 31st December 1877, I have the honor to offer the following remarks.

2. The ratio of dysentery and hepatitis to strength during 1875 although large for the command generally, seems not to depend upon any local condition of a specific and tangible nature, but to have been rather in accord with the fluctuations which from year to year occur in relation to the prevalence of endemic diseases; in fact, at some stations in the command both diseases were less prevalent than they had been on former occasions.

3. With reference to the expression "local conditions" as applied in reference to this subject, I assume that they include conditions of soil and climate. If they refer to cleanliness and conservancy, all stations occupied by British troops are preserved in a perfect state in both these respects, so that no defects exist to which disease is traceable. On the subject of increased rate of invaliding during 1875, I find that although it has been very large as compared to a series of years, it is somewhat less than in 1870. As to the cause of the very high ratio, explanation must be in some measure matter of opinion rather than of demonstration. I find, however, that the principal cause of invaliding has been recorded as "debility," in cases of the men sent to England no fewer than 154 men being invalided under this heading. Of these 111 were men 35 years of age and upwards, while 116 out of the 154 had at least 20 years' service. I find, however, that as in respect to the prevalence of endemic diseases at individual stations, so the rate of invaliding varies from year to year.

4. I consider the accompanying tabular statements of sufficient importance as illustrating these remarks that I beg to transmit them herewith:—

Table showing the Ratio per 1,000 *of Strength admitted for Dysentery and Hepatitis* (*including Abscess of Liver*) *at individual Stations in the Command for a period of* 3 *Years*—1873, 1874 *and* 1875.

Stations.	Ratio per 1,000 of Strength admitted for					
	1873.		1874.		1875.	
	Dysentery.	Hepatitis, including Abscess of Liver.	Dysentery.	Hepatitis, including Abscess of Liver.	Dysentery.	Hepatitis, including Abscess of Liver.
Madras and Palaveram ...	36·43	64·07	77·63	101·98	32·91	62·16
St. Thomas' Mount ...	94·29	77·14	101·69	50·85	54·50	70·84
Trichinopoly	89·35	75·60	95·62	39·84	32·37	68·35
Bellary	17·06	22·39	12·82	33·80	14·32	31·97
Bangalore	75·85	52·43	58·33	58·93	56·95	54·56
Cannanore	270·57	197·78	164·69	147·71	78·69	78·69
*Calicut	121·95	97·56	112·24	204·08	70·71	50·51
*Malliapooram	400·00	150·00	163·26	81·63	10·42	41·67
Secunderabad	114·87	93·57	69·81	81·99	88·25	77·33
Kamptee	30·85	21·89	21·11	40·20	14·93	33·83
Seetabuldee	42·55	..	86·96	21·74	21·74	...
Rangoon	70·35	54·11	111·24	75·69	103·23	52·90
Thayetmyo	32·53	59·93	54·57	98·82	35·29	79·41
Tonghoo	260·13	138·59	248·24	93·68	212·31	101·91
Port Blair (Depôts) ...	...	98·04	18·87	28·30	23·62	23·62
Poonamallee	351·56	617·19	605·88	547·06	392·86	443·88
Wellington	44·74	100·67	81·85	16·98	45·73	35·79
Ramandroog	...	...	46·51	139·53	48·78	...

65. In my annual report for 1873, paragraph 5, special attention was directed to this subject, and it was pointed out that as the mortality from dysentery appeared to be increasing, it became a question of interest whether the revival of the treatment of the disease by large doses of ipecacuanha, so successful for some years after 1860, had, or had not, fallen into abeyance. Dr. Massey, C.B., who was officiating as Surgeon-General in 1874 investigated the question, and came to the conclusion that the ipecacuanha treatment of dysentery was still generally practised by Medical Officers of the British Service, and that it had not fallen into disuse. He further showed that in the nineteen years from 1840 to 1858, the mortality from dysentery was 7·67 per cent. of the cases treated, and that in the fifteen years from 1859 to 1873 the mortality had fallen to 2·90 per cent. As the subject was fully illustrated by Dr. Massey, it is only necessary to refer to G.O., dated 24th October 1874, No. 3,477.

* The average annual strength at these stations is exceedingly small, viz., 93 and 91 respectively.

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66. But there is no doubt, I think, that certain local climatic conditions do influence the admissions from dysentery and hepatic diseases. Referring to some old statistics, embodied in the report of the Principal Inspector-General, Madras Medical Department, for the years 1859-60, it is shown that for the whole European army the proportions of dysentery and hepatic diseases were as follow :—

		Dysentery.	Hepatic Diseases.
1842 to 1858-59	treated to strength	121 per mille.	71 per mille.
"	deaths to "	8 "	3 "
"	" to treated	71 "	46 "

But for the troops at Secunderabad in the Deccan, we have the following figures :—

		Dysentery.	Hepatic Diseases.
1842 to 1858-59	treated to strength	228 per mille.	92 per mille.
"	deaths to "	16 "	5 "
"	" to treated	70 "	61 "

and the recent figures for Secunderabad still show an excess of dysentery and hepatitis over the average of the whole army, as per following table for the last ten years :—

Whole Army.

		Dysentery.	Hepatic Diseases.
1868 to 1877	admissions to strength	75·4 per mille.	70·5 per mille.
"	deaths to "	1·1 "	3·1 "
"	" to admissions	25·3 "	55·4 "

Secunderabad.

1868 to 1877	admissions to strength	110·4 per mille.	76·5 per mille.
"	deaths to "	3·6 "	6·7 "
"	" to admissions	32·7 "	88·1 "

67. In regard to fatal disease of the liver, we know that anything that tends to cause destructive ulceration of the lower bowel tends to produce abscess of the liver, and we know also that in many cases of tropical cachexia, the liver structure undergoes degenerative changes leading to abscess, without previous disease of the bowel.

68. The causation of fatal hepatic disease is a very complex question, and all the inquiry I have been able to make in regard to it leads me to defer offering remarks on data which are still imperfect.

Sunstroke and apoplexy, delirium tremens, accidental and violent deaths.

69. The mortality from sunstroke and apoplexy in 1877 has been somewhat in excess of the average, and this result is scarcely to be wondered at, when the remarkable intensity of solar heat during the greater period of the year is remembered; at Tonghoo three deaths occurred from sunstroke. For the first time probably in the history of the Madras Army, the medical returns do not show a death from delirium tremens.* Accidental and violent deaths have been rather above the average, and in regard to suicides I have to note that in no fewer than seven instances was the soldier's rifle used for self-destruction.

Deaths compared with former years.

70. The following table shows the chief causes of mortality in 1877, compared with the results of eight preceding years :—

* Two cases of "alcoholic poisoning" occurred, one in the 45th Regiment at Bangalore and another in the C-9th Brigade Royal Artillery at Thayetmyo.

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Table showing Causes of Mortality among British Troops Proper, during 1877, compared with previous Years.

Years.	Strength.	Small-pox.	Typhoid Fever.	Continued Fever.	Intermittent Fever.	Remittent Fever.	Cholera.	Phthisis Pulmonalis.	Sunstroke and Apoplexy.	Heart Diseases.	Respiratory Diseases.	Dysentery.	Diarrhœa.	Hepatic Diseases.	Venereal Diseases.	Delirium Tremens.	Violence and Accidents.	Other Diseases.	Total.
1869	10,277	3	11	3	...	11	27	9	17	13	7	16	9	54	2	10	19	28	289
1870	10,738	...	14	1	...	7	39	10	5	19	7	23	...	35	2	3	18	29	212
1871	10,684	...	15	4	...	6	36	11	3	19	10	20	...	36	1	6	21	17	205
1872	11,224	2	26	5	...	3	2	17	18	22	2	27	2	41	3	4	14	28	216
1873	11,341	1	10	3	...	4	14	9	9	24	6	33	1	56	1	1	24	14	210
1874	11,343	1	12	1	...	...	1	13	6	14	6	12	...	45	2	1	15	23	152
1875	11,005	...	7	2	...	2	4	13	5	22	4	16	1	37	5	3	23	19	163
1876	10,823	...	21	4	...	1	17	9	20	14	5	17	1	27	1	2	19	16	174
Mean of 8 years ...	10,929	1	14	3	...	4	18	11	10	18	6	21	2	41	2	4	19	22	196
1877	10,782	...	22	1	...	1	19	12	16	16	4	20	4	31	1	...	21	18	186
Ratio per 1,000 of Strength.																			
1869		0·29	1·07	0·29	...	1·07	2·62	0·87	1·65	1·26	0·68	1·55	0·87	5·25	0·19	0·97	1·85	2·72	23·25
1870		...	1·30	0·09	...	0·65	3·63	0·93	0·46	1·77	0·65	2·14	...	3·26	0·18	0·28	1·67	2·70	19·75
1871		...	1·40	0·37	...	0·56	3·37	1·02	0·28	1·77	0·93	1·86	...	3·37	0·09	0·56	1·96	1·59	19·18
1872		0·17	2·31	0·44	...	0·26	0·17	1·51	1·60	1·96	0·17	2·40	0·17	3·65	0·26	0·35	1·24	2·49	19·24
1873		0·08	0·88	0·26	...	0·35	1·23	0·79	0·79	2·11	0·52	2·90	0·08	4·93	0·08	0·08	2·11	1·23	18·51
1874		0·08	1·05	0·08	...	...	0·08	1·14	0·52	1·23	0·52	1·05	...	3·96	0·17	0·08	1·32	2·02	13·40
1875		...	0·63	0·18	...	0·18	0·36	1·18	0·45	1·99	0·36	1·45	0·09	3·36	0·45	0·27	2·08	1·72	14·81
1876		...	1·94	0·37	...	0·09	1·57	0·83	1·84	1·29	0·46	1·57	0·09	2·49	0·09	0·18	1·75	1·47	16·07
Mean of 8 years ...		0·09	1·28	0·27	...	0·36	1·64	1·00	0·91	1·64	0·54	1·92	0·18	3·75	0·18	0·36	1·73	2·01	17·93
1877		...	2·04	0·09	...	0·09	1·76	1·11	1·48	1·48	0·37	1·85	0·37	2·87	0·09	...	1·94	1·66	17·25

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71. The total number of men invalided in the Madras Command during 1877 was 510. Of these 113 were sent home for discharge, and 397 for "change of climate."

Invaliding.

The numbers do not differ greatly from those of the former year, and are much below the invaliding of 1875. Debility, phthisis, heart disease, venereal, dysentery and hepatitis were the chief causes of invaliding.

72. Particulars as to the stations and diseases, will be found in the annexed tabular statements :—

Table showing the Ratio of Invaliding per 1,000 of Strength from each cause among British Troops during* 1877, *compared with previous years.*

Invalided.	1860.	1861.	1862.	1863.	1864.	1865.	1866.	1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.
For discharge ...	8·12	13·31	9·58	11·57	14·01	4·98	10·55	10·56	9·54	8·27	6·61	12·53	11·29	12·77	8·37	15·58	10·95	10·25
For change of climate	49·64	22·25	18·75	28·52	51·03	33·92	46·14	44·10	52·86	47·48	70·43	29·76	26·85	50·66	29·54	60·80	31·98	36·03

Table showing the Stations from which Invalids were sent with respective Numbers and Ratios per 1,000 *of Strength.*

Stations.	Number Invalided for			Ratio per 1,000 of Strength.		
	Discharge.	Change of Climate.	Total.	Discharge.	Change of Climate.	Total.
Bangalore	11	42	53	6·4	24·3	30·6
Bellary	6	26	32	7·1	30·8	37·9
Cannanore	13	21	34	20·5	33·1	53·6
Kamptee	3	11	14	3·6	13·3	16·9
Madras	7	14	21	10·8	21·7	32·5
Poonamallee	19	103	122	122·6	664·5	787·1
Rangoon	12	57	69	16·1	76·1	92·1
St. Thomas' Mount	1	13	14	3·1	40·5	43·6
Secunderabad	19	33	52	7·9	13·7	21·7
Trichinopoly	...	21	21	...	73·7	73·7
Wellington	22	56	78	42·1	107·1	149·1

Table showing the Number of Men Invalided for Change of Climate and for Discharge during 1877.

Invalided.	Enteric Fever.	Simple Continued Fever.	Intermittent Fever.	Remittent Fever.	Rheumatism.	Phthisis Pulmonaris.	Atrophy and Anaemia.	Dropsies.	Sunstroke and Apoplexy.	Heart Diseases.	Respiratory Diseases.	Dysentery.	Diarrhoea.	Hepatic Diseases.	Spleen Diseases.	*Venereal Diseases.	General Debility.	Skin Diseases.	Violence and Accidents.	All other Diseases.	Total.
Discharge	...	...	...	...	2	21	...	...	...	16	6	2	...	6	...	5	13	1	5	36	113
Change of Climate	...	...	7	...	16	19	4	...	...	23	13	57	9	61	...	29	109	2	1	47	397
Total ...	...	...	7	...	18	40	4	...	...	39	19	59	9	67	...	34	122	3	6	83	510

Venereal Diseases.

1872	1,776
1873	1,683
1874	2,035
1875	2,152
1876	1,906
1877	2,450

73. The total admissions of former years from the different forms of venereal disease are shown in the margin, contrasted with the figures for 1877. It will be observed that the numbers have been largely increased during the past year. The number of admissions from primary syphilis have almost doubled since 1876.

* Calculated on the general strength of the whole army.

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The increase has been specially noticeable in Bangalore, Bellary, Calicut, Madras, St. Thomas' Mount, Secunderabad, and Trichinopoly, and I apprehend the cause is to be found in the enormous numbers of destitute females wandering into the cantonments within the famine districts, many of whom have been but too ready to prostitute themselves for the means of existence. This would seem to be a curious effect of famine, but looking to the enormous increase of veneral admissions of troops in some of the worst famine areas, I have no doubt that the explanation is the true one.* It only shows the extreme difficulty of working to advantage any regulations for the suppression of such diseases, when the non-resident class of prostitutes becomes suddenly uncontrollable. All rules in regard to registration of habitual prostitutes resident in cantonment must break down under circumstances like the famine, when every barrack has been surrounded by swarms of half-starved wanderers ready to sell themselves or children for the price of a meal of food.

74. Nothing has been more remarkable in connection with the famine than the complete disruption of family life amongst the lower orders of the Native community.

Amongst the coolies on relief-works, more than one-half of the women on being questioned would state that their husbands had gone away or deserted them, and it is an undoubted fact that in thousands of instances the females of the family were left to shift for themselves during the most terrible time of the food distress. Under the circumstances of this abnormal freedom from restraint, and with the promiscuous herding of the sexes on relief-works, and in public chuttrums and choultries, it is scarcely to be wondered at that venereal affections should have become aggravated, and that the European soldier should contract these ailments in an undue proportion.

75. In regard to restrictive regulations, it is quite clear that the increased amount of disease in the army is not attributable to the registered women living in cantonments. The famine has brought an increased number of females temporarily on the cantonment registers, but it also brought hundreds of diseased women within reach of the soldiers, who, from the very nature of the calamity, could not be treated as public women. The regulations in fact have failed especially in the past year, from an exaggeration of the number of women temporarily resorting to prostitution as a livelihood. At all times the chief difficulty has been in dealing with the class of women who do not make a regular trade of prostitution, but in the past year the difficulties throughout the famine area have been intensified.

76. The following table shows the admissions amongst British troops and registered women:—

* The reports of Medical Officers of Lock Hospitals entirely confirm this view. They show that the worst forms of disease were found amongst the unregistered famine-stricken females who flocked into the towns and cantonments in vast numbers.

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Tableshowing the Relative Prevalence of Primary and Secondary Syphilis and Gonorrhœal Diseases amongst the British Troops and Registered Prostitutes of the Military Stations in the Madras Presidency during the Year 1877.

Stations.	Troops.									Prostitutes.								
		Primary Syphilis.		Secondary Syphilis.		Gonorrhœal Diseases.		Total, Venereal Diseases.			Primary Syphilis.		Secondary Syphilis.		Gonorrhœal Diseases.		Total, Venereal Diseases.	
	Strength.	Admissions.	Ratio per 1,000 of Strength.	Admissions.	Ratio per 1,000 of Strength.	Admissions.	Ratio per 1,000 of Strength.	Admissions.	Ratio per 1,000 of Strength.	Strength.	Admissions.	Ratio per 1,000 of Strength.	Admissions.	Ratio per 1,000 of Strength.	Admissions.	Ratio per 1,000 of Strength.	Admissions.	Ratio per 1,000 of Strength.
Bangalore	1,730	226	130·6	23	13·29	190	109·8	439	253·7	89	105	1179·7	2	22·4	440	4943 8	547	6146·07
Bellary	845	242	286·4	13	15·4	163	192·9	418	494·7	104	113	1086·5	...	...	285	2740·4	398	3826·9
Cannanore	634	6	9·4	14	22·1	35	55·2	55	86·7	31	8	258·07	...	...	81	2612·9	89	2870·9
Calicut	97	12	123·7	2	20·6	8	82·5	22	226·8	No Lock Hospital.								
Kamptee	830	48	57·8	8	9·6	139	167·4	195	234·9	69	30	434·8	...	...	127	1840·6	157	2275·3
Madras	646	69	106·8	5	7·7	107	165·6	181	280·1	809	397	490·7	39	48·2	474	585·9	910	1124·8
Malliapooram	94	2	21·3	7	74·5	2	21·3	11	117·0	No Lock Hospital.								
Poonamallee	155	1	6·4	29	187·1	9	58·0	39	251 6	The women of these stations are sent to St. Thomas' Mount.								
Palaveram	81	...	...	...	...	1	12·3	1	12·3									
Port Blair	134	2	14·9	4	29·8	3	22·4	9	67·2									
Ramandroog	58	3	51·7	1	17·2	4	68·9	8	137·9	No Lock Hospital.								
Rangoon	749	69	92·1	28	37·4	46	61·4	143	190·9	443	600	1354·4	33	74·5	317	715·5	950	2144·4
St. Thomas' Mount ...	321	37	115·2	5	15·5	54	168·2	96	299·0	49	16	326·5	3	61·2	119	2428·6	138	2816·3
Secunderabad ...	2,401	245	102·04	65	27·07	217	90·3	527	219·4	150	282	1880·0	3	20·0	218	1453·3	503	3353·3
Seetabuldee	49	7	142·9	2	40·8	7	142·9	16	326·5	17	2	117·7	...	...	56	3294·1	58	3411·8
Trichinopoly	285	32	112·3	10	35·09	57	200·0	99	347·3	45	32	711·1	...	...	124	2755·5	156	3466·6
Thayetmyo	572	20	34·9	4	6·9	42	73·4	66	115·3	24	4	166·6	1	41·6	42	1750·0	47	1958·3
Tonghoo	417	19	45·5	4	9·6	31	74·3	54	129·5	212	23	108·5	...	...	40	188·7	63	297·1
Wellington	523	17	32·5	14	26·8	40	76·4	71	135·7	42	40	952·4	2	47·6	52	1238·1	94	2238·1
Total ...	10,621	1,057	99·5	238	22·4	1,155	108·7	2,450	230·6	2,084	1,652	792·7	83	39·8	2,375	1139·6	4,110	1972·1

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WOMEN.

Sickness and mortality among Soldiers' wives.

77. The strength of the women belonging to British troops was 1,365. The hospital admissions 1,553. Daily sick 51·0, and deaths 37.

78. The proportions of admissions and deaths to strength for a series of years are shown below :—

—	1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.
Admissions per mille.	816·6	857·03	1061·5	956·3	754·9	1150·2	1045·5	896·3	874·05	1005·6	1137·7
Deaths per mille in and out of hospital.	13·1	10·8	15·2	19·5	13·8	15·2	13·2	19·1	17·8	19·1	27·1

79. The sickness and mortality have been higher than the average. With so much small-pox and cholera in Native bazaars and Cantonments it is not surprising to find that 8 cases of small-pox occurred, without any death, and 12 of cholera with 7 deaths.

80. There were 306 cases of child-birth during the year, besides 17 cases of abortion, and three admissions for puerperal diseases. Cholera occurred in six of the eighteen stations.

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Table showing the Admissions and Deaths among Women belonging to the European Corps stationed in the Madras Presidency during the Year 1877.

	Bangalore.	Bellary.	Cannanore.	Calicut.	Kamptee.	Madras.	Malliapooram.	Poonamallee.	Palaveram.	Port Blair.	Ramandroog.	Rangoon.	St. Thomas' Mount.	Secunderabad.	Trichinopoly.	Thayetmyo.	Tonghoo.	Wellington.	Total.
Strength	273	112	96	6	128	80	5	28	2	1	8	79	49	291	25	55	37	90	1,365
Admitted	172	194	55	10	135	173	9	55	...	...	8	82	95	309	23	64	31	138	1,553
Died in Hospital	9	4	3	...	4	1	...	2	...	...	...	1	1	7	...	1	1	3	37
Do. out of do.	...	1	...	...	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...
Daily sick	6·83	7·39	1·81	0·37	3·66	5·94	0·19	2·43	...	...	0·59	2·14	2·35	8·97	0·73	1·95	1·04	4·62	51·01

Diseases.	Bangalore. A.	Bangalore. D.	Bellary. A.	Bellary. D.	Cannanore. A.	Cannanore. D.	Calicut. A.	Calicut. D.	Kamptee. A.	Kamptee. D.	Madras. A.	Madras. D.	Malliapooram. A.	Malliapooram. D.	Poonamallee. A.	Poonamallee. D.	Palaveram. A.	Palaveram. D.
Small-pox	2	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
Chicken-pox...	...	...	...	...	...	...	...	...	...	...	...	...	..	...	..	...	...	...
Typhoid fever	3	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Dengue do.	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Continued do.	21	...	13	...	4	...	1	...	16	1	6	...	...	...	13	...	...	...
Intermittent do.	3	...	27	...	...	...	...	...	9	...	2	...	...	...	1	...	...	...
Remittent do.	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cholera	3	2	2	1	1	1	...	...	...	...	2	1	...	...	2	1	...	...
Rheumatism	...	...	2	...	3	...	...	...	...	...	1	...	..	...	3	...	...	...
Phthisis Pulmonalis	..	...	2	...	2	1	...	...	2	2	...	...	...	...	...	...	...	...
Other lung diseases	12	...	7	...	4	...	...	...	37	...	1	...	...	...	...	...	...	...
Atrophy and Anæmia	...	...	20	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...
Ophthalmia	...	...	8	...	...	...	...	...	..	...	...	...	...	...	...	...	...	...
Other eye diseases	6	...	7	...	...	...	...	...	15	...	5	...	1	...	6	...	...	...
Diseases of the heart.	2	...	1	...	...	...	...	...	...	...	...		...	...	...	...	...	...
Hysteria	2		...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
Diseases of the brain & nervous system... ...	4	...	3	...	...	...	...	...	...	...	4	...	...	...	...	...	...	...
Dysentery	6	...	6	...	...	...	...	...	5	1	2	...	...	...	2	..	...	...
Diarrhœa	14	1	5	...	3	..	...	...	3	...	8	...	1	...	2	...	...	...
Diseases of the Liver	2	1	2	...	...	...	1	...	...	...	10	...	...	...	...	...	...	...
Abortion	1	...	2	...	...	...	...	...	...	...	2	...	...	...	1	...	...	...
Child-birth	43	...	35	...	22	...	2	..	38	..	30	...	4	...	6	...	...	...
Puerperal diseases...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Other diseases	46	4	51	3	15	1	6	...	10	...	98	...	3	...	16	1	...	...
Total ...	172	9	194	4	55	3	10	...	135	4	173	1	9	...	55	2	...	...
Ratio per 1,000 of strength	630·0	32·9	1732·1	35·7	572·9	31·2	1666·6	...	1054·6	31·2	2162·5	12·5	1800·0	...	1964·3	71·4	...	...

Diseases.	Port Blair. A.	Port Blair. D.	Ramandroog. A.	Ramandroog. D.	Rangoon. A.	Rangoon. D.	St. Thomas' Mount. A.	St. Thomas' Mount. D.	Secunderabad. A.	Secunderabad. D.	Trichinopoly. A.	Trichinopoly. D.	Thayetmyo. A.	Thayetmyo. D.	Tonghoo. A.	Tonghoo. D.	Wellington. A.	Wellington. D.	Total. A.	Total. D.
Small-pox	...	...	...	...	...	...	...	...	3	...	...	...	...	..	1	...	1	...	8	...
Chicken-pox...	...	...	...	...	...	...	..	...	2	...	...	...	...	...	1	...	...	...	3	...
Typhoid fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	1
Dengue do.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...
Continued do.	...	...	...	...	6	...	3	...	18	1	2	...	2	...	2	...	10	...	117	2
Intermittent do.	...	...	...	...	...	...	2	...	16	...	...	...	...	...	.	..	13	...	73	...
Remittent do.	...	...	...	..	...	...	...	...	2	...	...	...	...	...	...	...	...	...	2	...
Cholera	...	...	...	..	...	...	...	..	...	...	...	...	2	1	...	...	...	...	12	7
Rheumatism	...	...	...	...	...	...	...	...	3	...	...	...	...	...	...	...	1	...	13	...
Phthisis Pulmonalis	...	...	1	...	...	...	1	...	1	...	...	...	1	...	...	...	1	...	11	3
Other lung diseases	...	...	...	...	5	...	1	...	9	1	...	...	2	...	2	...	3	...	82	1
Atrophy and Anæmia	...	...	2	...	...	...	...	...	3	...	...	...	...	...	...	...	...	...	28	...
Ophthalmia	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	8	...
Other eye diseases	...	...	...	...	...	...	2	...	28	...	3	...	1	..	...	...	...	...	74	...
Diseases of the heart.	...	...	...	...	...	...	...	...	2	1	...	...	1	...	...	...	1	...	7	1
Hysteria	...	...	...	...	...	...	1	...	1	...	...	...	1	...	...	...	...	...	6	...
Diseases of the brain & nervous system... ...	...	...	...	...	3	...	2	...	6	1	...	...	...	..	...	...	2	...	24	1
Dysentery	...	...	1	...	14	...	4	...	12	...	1	...	1	...	2	...	8	1	64	2
Diarrhœa	...	...	...	...	5	...	4	...	16	...	1	...	1	..	2	...	4	...	69	1
Diseases of the Liver	...	...	...	...	1	...	2	...	5	...	...	...	3	...	...	...	4	...	30	1
Abortion	...	...	1	..	2	...	...	...	3	1	...	...	2	...	3	1	...	...	17	2
Child-birth	...	...	3	...	15	...	19	...	29	...	2	...	19	...	8	...	31	...	306	...
Puerperal diseases...	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	3	1
Other diseases	...	...	...	...	31	1	54	1	150	2	14	...	28	...	11	...	58	1	591	14
Total ...	...	...	8	...	82	1	95	1	309	7	23	...	64	1	31	1	138	3	1,553	37
Ratio per 1,000 of strength	...	...	1000·0	...	1087·9	12·7	1938·8	20·4	1061·8	24·05	920·0	...	1163·6	18·1	837·8	27·02	1533·3	33·3	1137·7	27·1

CHILDREN.

81. The strength of the soldiers' children was 2,758. The total number of hospital admissions 1,933. The daily sick 65·2, and total stational deaths 177. Two other deaths occurred on the march, one from teething and the other from debility, making the total deaths 179.

Sickness and mortality.

82. The season was a trying one for European children owing to the intense heat, the scarcity and high prices of food, and the general prevalence of epidemic pestilence. A rather severe outbreak of cholera occurred amongst the children at Thayetmyo, 9 cases and 6 deaths. The proportions of sickness and mortality of children were higher than in the preceding year, as shown in the table below for the last 10 years :—

—	1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.
Admissions per mille.	571·7	693·2	672·7	714·6	581·3	759·03	633·07	537·3	554·01	594·7	700·8
Deaths per mille in and out of hospital.	45·6	54·1	74·02	65·4	44·6	68·5	47·5	46·6	54·01	61·7	64·9

83. The mortality as usual was chiefly of children under two years of age as shown below :—

Table showing the Mortality among the Children belonging to the European Corps, for 1877.

—	Ages of Children.								Total.
	Under 1 year.	1 to 2.	2 to 3.	3 to 4.	4 to 5.	5 to 10.	10 to 15.	Above 15 years.	
Asphyxia by drowning	...	...	...	...	...	1	...	...	1
Atrophy	1	...	...	...	...	...	...	...	1
Ague	...	...	...	1	1	...	...	...	2
Ascaris lumbricoides	...	2	...	...	...	...	...	...	2
Bronchitis	2	...	...	...	...	...	...	...	2
Cholera	1	2	...	4	1	3	1	...	12
Convulsions	23	4	...	2	...	...	...	...	29
Cancrum Oris	...	1	...	...	...	...	...	...	1
Croup	1	...	...	...	...	1	...	...	2
Dysentery	4	4	...	...	1	...	...	...	9
Diarrhœa	15	11	3	...	...	1	...	...	30
Enteric fever	...	...	...	...	...	1	1	...	2
General Debility	18	7	1	1	...	...	...	...	27
Do. Dropsy	...	...	1	...	...	...	...	...	1
Hereditary syphilis	1	...	...	...	...	...	...	...	1
Intussusception	1	...	...	...	...	...	...	...	1
Jaundice	1	...	...	...	...	...	...	...	1
Inflammation of external meatus associated with meningitis.	1	...	...	...	...	...	...	...	1
Meningitis	1	...	1	...	...	1	1	...	4
Pneumonia	2	1	...	...	...	...	...	...	3
Premature birth	3	...	...	...	...	...	...	...	3
Paralysis	...	...	...	...	...	1	...	...	1
Remittent fever	1	...	...	1	...	...	...	...	2
Simple continued fever ...	2	...	...	...	...	3	...	...	5
Small-pox	...	...	...	...	...	1	...	...	1
Scald	...	1	...	...	...	...	...	...	1
Teething	14	7	...	...	...	...	...	...	21
Do. associated with convulsions.	1	...	...	...	...	...	...	...	1
Tuberculosis	...	...	...	...	...	1	...	...	1
Tabes Mesenterica	1	8	...	...	...	2	...	...	11
Total ...	94	48	6	9	3	16	3	...	179

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Table showing the Admissions and Deaths among the Children belonging to the European Corps stationed in the Madras Presidency during the Year 1877.

—	Bangalore.	Bellary.	Cannanore.	Calicut.	Kamptee.	Madras.	Mallipoorum.	Poonamallee.	Palaveram.	Port Blair.	Ramandroog.	Rangoon.	St. Thomas' Mount.	Secunderabad.	Trichinopoly.	Thayetmyoo.	Tonghoo.	Wellington.	Total.
Strength ...	580	235	239	12	182	172	10	57	3	5	17	148	97	543	49	114	75	220	2,758
Admitted ...	152	303	46	12	167	214	5	67	...	...	4	105	94	470	33	80	28	153	1,933
Died in hospital ...	24	20	11	2	13	10	1	4	...	...	...	7	6	33	4	13	2	18	168
Died out of hospital ...	4	1	1	...	...	1	...	...	...	...	...	...	...	1	...	1	...	...	9
Daily sick ...	6·11	10·61	1·23	0·52	5·81	7·94	0·14	2·99	...	...	0·26	3·33	2·06	13·56	1·03	1·93	0·44	7·75	65·21

Diseases.	Bangalore. A.	Bangalore. D.	Bellary. A.	Bellary. D.	Cannanore. A.	Cannanore. D.	Calicut. A.	Calicut. D.	Kamptee. A.	Kamptee. D.	Madras. A.	Madras. D.
Small-pox ...	4	...	...	...	...	...	...	...	1	1	...	...
Chicken-pox ...	1	...	1	...	...	...	...	...	1	...	...	...
Measles ...	5	...	5	...	...	...	...	...	1	...	2	...
Typhoid fever ...	4	...	...	...	...	...	...	...	...	...	...	...
Dengue do. ...	...	...	...	...	...	...	...	...	...	...	...	...
Continued do. ...	20	1	42	...	7	...	...	...	29	1	22	...
Intermittent do. ...	2	...	38	2	...	...	...	...	15	...	...	...
Remittent do. ...	...	...	2	2	...	...	...	...	...	...	...	...
Cholera ...	3	3	...	...	...	...	...	...	...	...	...	...
Influenza ...	...	...	...	...	...	...	...	...	...	...	1	...
Pertussis ...	...	...	...	...	...	...	...	...	...	...	...	...
Atrophy and Anæmia ...	1	1	...	...	...	...	...	...	...	...	...	...
Ophthalmia ...	1	...	10	...	...	...	...	...	...	...	...	...
Other eye diseases ...	22	...	53	...	...	...	...	...	65	...	11	...
Convulsions ...	7	5	1	1	3	2	...	...	3	2	7	4
Diseases of the brain and nervous system ...	2	1	...	...	...	...	...	...	1	1	...	...
Dysentery ...	13	1	12	2	9	1	1	...	2	...	13	...
Diarrhœa ...	32	4	24	1	6	2	11	2	8	...	49	5
Teething ...	10	4	41	4	4	4	...	...	3	2	1	...
Tonsilitis ...	1	...	2	...	...	...	...	...	1	...	2	...
Still-born ...	...	...	...	...	...	...	...	...	...	...	...	...
Premature birth ...	...	...	...	...	...	...	...	...	1	1	...	...
Vermes ...	...	...	...	...	...	...	...	...	...	...	...	...
Other diseases ...	24	4	72	8	17	2	...	...	36	5	106	1
Total ...	152	24	303	20	46	11	12	2	167	13	214	10
Ratio per 1,000 of strength ...	262·1	41·3	1197·6	79·0	192·5	46·0	1000·0	166·6	917·0	71·4	1244·2	58·1

Diseases.	Mallipoorum. A.	Mallipoorum. D.	Poonamallee. A.	Poonamallee. D.	Palaveram. A.	Palaveram. D.	Port Blair. A.	Port Blair. D.	Ramandroog. A.	Ramandroog. D.	Rangoon. A.	Rangoon. D.
Small-pox ...	...	...	...	...	...	...	...	...	...	...	...	...
Chicken-pox ...	...	...	...	...	...	...	...	...	...	...	...	...
Measles ...	...	...	...	...	...	...	...	...	...	...	...	...
Typhoid fever ...	...	...	...	...	...	...	...	...	...	...	...	...
Dengue do. ...	...	...	...	...	...	...	...	...	...	...	...	...
Continued do. ...	...	...	12	...	...	...	...	...	...	...	4	1
Intermittent do. ...	...	...	1	...	...	...	...	...	1	...	...	...
Remittent do. ...	...	...	...	...	...	...	...	...	...	...	...	...
Cholera ...	...	...	...	...	...	...	...	...	...	...	...	...
Influenza ...	...	...	...	...	...	...	...	...	...	...	...	...
Pertussis ...	...	...	...	...	...	...	...	...	...	...	...	...
Atrophy and Anæmia ...	...	...	6	...	...	...	...	...	...	...	...	...
Ophthalmia ...	...	...	1	...	...	...	...	...	...	...	...	...
Other eye diseases ...	...	...	11	...	...	...	...	...	1	...	...	...
Convulsions ...	1	1	2	1	...	...	...	...	...	...	1	1
Diseases of the brain and nervous system ...	...	...	...	...	...	...	...	...	...	...	3	1
Dysentery ...	1	...	1	...	...	...	...	...	...	...	12	...
Diarrhœa ...	...	...	17	2	...	...	...	...	1	...	13	2
Teething ...	...	...	1	...	...	...	...	...	...	...	4	...
Tonsilitis ...	...	...	1	...	...	...	...	...	...	...	...	...
Still-born ...	...	...	...	...	...	...	...	...	...	...	...	...
Premature birth ...	...	...	...	...	...	...	...	...	...	...	...	...
Vermes ...	...	...	...	...	...	...	...	...	...	...	...	...
Other diseases ...	3	...	14	1	...	...	...	...	1	...	68	2
Total ...	5	1	67	4	...	...	...	...	4	...	105	7
Ratio per 1,000 of strength ...	500·0	100·0	1175·4	70·2	...	...	...	...	235·3	...	709·4	47·3

Diseases.	St. Thomas' Mount. A.	St. Thomas' Mount. D.	Secunderabad. A.	Secunderabad. D.	Trichinopoly. A.	Trichinopoly. D.	Thayetmyoo. A.	Thayetmyoo. D.	Tonghoo. A.	Tonghoo. D.	Wellington. A.	Wellington. D.	Total. A.	Total. D.
Small-pox ...	...	...	...	...	...	...	...	...	...	...	2	...	7	1
Chicken-pox ...	...	...	11	...	3	...	...	...	...	...	...	...	17	...
Measles ...	1	...	...	...	...	...	...	...	...	...	1	...	15	...
Typhoid fever ...	...	...	2	2	...	...	...	...	...	...	...	...	6	2
Dengue do. ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Continued do. ...	8	...	25	1	7	1	5	...	4	...	26	...	211	5
Intermittent do. ...	...	...	19	...	...	...	4	...	...	...	12	...	92	2
Remittent do. ...	1	...	1	...	...	...	...	...	...	...	...	...	4	2
Cholera ...	2	2	2	1	...	...	9	6	...	...	...	...	16	12
Influenza ...	...	...	...	...	...	...	...	...	...	...	...	...	1	...
Pertussis ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Atrophy and Anæmia ...	...	...	...	...	...	...	...	...	...	...	...	...	7	1
Ophthalmia ...	1	...	1	...	...	...	1	...	...	...	...	...	15	...
Other eye diseases ...	19	...	232	...	12	...	1	...	...	...	1	...	428	...
Convulsions ...	2	1	6	4	...	...	3	3	...	...	3	2	39	27
Diseases of the brain and nervous system ...	1	1	...	...	...	...	...	...	...	...	2	2	9	6
Dysentery ...	13	1	19	1	...	...	1	...	1	...	13	2	111	8
Diarrhœa ...	15	...	50	9	3	...	10	1	10	...	13	1	262	29
Teething ...	4	...	21	2	3	3	1	1	...	...	7	1	100	21
Tonsilitis ...	1	...	4	...	1	...	...	...	...	...	2	...	15	...
Still-born ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Premature birth ...	...	...	1	1	...	...	...	...	...	...	...	...	2	2
Vermes ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Other diseases ...	26	1	76	12	4	...	45	2	13	2	71	10	576	50
Total ...	94	6	470	33	33	4	80	13	28	2	153	18	1,933	168
Ratio per 1,000 of strength ...	969·1	61·8	865·5	60·7	673·5	81·6	701·7	114·0	373·3	26·6	695·4	81·8	700·8	60·9

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EUROPEAN ARMY STATIONAL.

Bangalore.

Latitude, 12° 58′.
Longitude, 77° 39′.
Height above sea, 3,000 feet.
Mean temperature, 75° 40′.
Average rainfall, 34 inches.
Rainfall in 1877, 39 do.

Strength, sickness, and mortality.

84. The mean annual strength of the British force at Bangalore was 1,730, the total hospital admissions 1,459, average daily sick 83·4, and deaths 24. Two deaths occurred out of hospital.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years, average.	1128·0	51·7	12·1
1877	843·3	48·2	13·8

85. The ratios of sickness and mortality are contrasted in the margin with the results of the previous eleven years. But for the numerous admissions from venereal disease the sickness would have been very small. The death-rate was slightly above the average.

Composition of force.

86. The table below shows the composition of the force, the period of residence and the sickness and mortality in each corps. The 14th Hussars in the first year of its Indian service suffered proportionately more than the Infantry Regiment, or Artillery.

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—	Corps.								Ratio per 1,000 of Strength.							
	Head Quarters C Brigade R. A. and Details.	C Baty. B Brigade R. A.	C Baty. 9th Brigade R. A.	D Baty. 6th Brigade R. A.	45th Regiment Sherwood Foresters	14th Hussars.	A Baty. 6th Brigade R. A.	Garrison	Head Quarters C Brigade R. A. and Details.	C Baty. B Brigade R. A.	C Baty. 9th Brigade R. A.	D Baty. 6th Brigade R. A.	45th Regiment Sherwood Foresters.	14th Hussars.	A Baty. 6th Brigade R. A.	Garrison.
No. of weeks resident ...	52	52	7	52	52	52	45	52	...	...	...	...	...	...	...	...
Strength	42	158	131	152	785	444	152	30	...	...	...	...	...	...	...	...
Total Admissions ...	5	175	5	207	395	497	175	18	119·0	1107·6	38·1	1361·8	503·2	1119·3	1151·3	600·
Daily Sick	1·58	10·87	5·04	10·80	19·75	31·51	10·81	1·05	37·6	68·8	38·4	71·0	25·1	70·9	71·1	35
Died in Hospital	1	3	...	3	4	10	1	...	23·8	18·9	...	19·7	5·1	22·5	6·5	...
Do. out of do.	...	...	...	...	2	...	...	...	...	...	...	...	2·5	...	...	...

Corps (A. = Admissions, D. = Deaths):

	Head Quarters C Brigade R. A. and Details. A.	D.	C Baty. B Brigade R. A. A.	D.	C Baty. 9th Brigade R. A. A.	D.	D Baty. 6th Brigade R. A. A.	D.	45th Regiment Sherwood Foresters A.	D.	14th Hussars. A.	D.	A Baty. 6th Brigade R. A. A.	D.	Garrison A.	D.
Small-pox	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
Fevers	1	...	28	2	...	...	34	2	45	...	77	3	18	...	6	...
Cholera	...	...	...	...	...	...	2	1	...	...	2	2	1	...	...	...
Rheumatism	...	...	12	...	...	...	8	...	10	...	7	...	5	...	1	...
Dysentery	...	...	14	...	...	...	7	...	21	1	29	1	16	...	...	...
Diarrhœa	...	...	6	...	...	...	10	...	12	...	18	...	3	...	1	...
Hepatitis	1	...	15	...	2	...	3	...	19	...	15	1	20	...	...	...
Venereal diseases ...	...	...	43	...	2	...	53	...	142	...	160	1	37	...	...	...

Ratio per 1,000 of Strength (A. = Admissions, D. = Deaths):

	Head Quarters C Brigade R. A. and Details. A.	D.	C Baty. B Brigade R. A. A.	D.	C Baty. 9th Brigade R. A. A.	D.	D Baty. 6th Brigade R. A. A.	D.	45th Regiment Sherwood Foresters. A.	D.	14th Hussars. A.	D.	A Baty. 6th Brigade R. A. A.	D.	Garrison. A.	D.
Small-pox	...	...	...	...	...	...	...	...	1·2	...	...	...	...	...	...	...
Fevers	23·8	...	177·2	12·6	...	...	223·6	13·1	57·3	...	173·4	6·7	35·5	...	200	...
Cholera	...	...	...	...	...	...	13·1	6·6	...	...	4·5	4·5	6·5	...	...	...
Rheumatism	...	...	75·8	...	...	...	52·6	...	12·6	...	15·7	...	32·9	...	33·3	...
Dysentery	...	...	88·6	...	...	...	46·1	...	26·7	1·2	65·3	2·2	105·2	...	...	...
Diarrhœa	...	...	37·8	...	...	...	65·7	...	15·2	...	40·5	...	19·7	...	33·3	...
Hepatitis	23·8	...	94·9	...	15·2	...	19·7	...	24·2	...	33·8	2·2	131·5	...	...	...
Venereal diseases ...	...	...	272·1	...	15·2	...	348·7	...	180·9	...	360·3	2·2	243·4	...	...	...

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Principal diseases.

87. The station was overrun for many months of the year by wanderers from the famine districts, many hundreds of whom were picked up dead in the streets. Cholera, small-pox and fevers prevailed greatly amongst the Native community; but the European troops had no unusual sickness, beyond venereal.

Causes of death.

88. The fatal cases, 24 in number, are thus given: from enteric fever 7, cholera 3, phthisis 3, heart disease 4, dysentery 2, hepatitis 1, primary syphilis 1, meningitis 1, alcoholic poisoning 1, and intussusception 1.

Bellary.

Latitude, 15° 10′.
Longitude, 76° 53′.
Height above sea, 1,500 feet.
Mean temperature, 80°.
Average rainfall, 17 inches.
Rainfall in 1877, 26·5 do.

Strength, sickness, and mortality.

89. The strength of the troops at this station was 845, the total admissions into hospital 1,243, the average daily sick 64·8, and deaths 8. Two of the deaths occurred out of hospital.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years' average.	1166·9	60·9	9·8
1877	1471·0	76·7	9·5

90. The proportions of sickness and mortality are here contrasted with the results of the previous eleven years. It will be seen that the admissions and daily sick have been in excess of the average, but not the mortality. More than one-third of the admissions were due to venereal affections, which have been the main cause of the high proportion of daily sick in 1877.

Composition of force.

91. The composition of the force and sickness and mortality is shown below. Although cholera prevailed severely in and around the station, only two cases occurred amongst the European troops, neither of which was fatal. The proportion of admissions from venereal diseases in the 43rd Regiment was double that of the Royal Artillery.

—	Corps.				Ratio per 1,000 of Strength.			
	B-6th Brigade R. A.		43rd Regiment L. I.		B-6th Brigade R. A.		43rd Regiment L. I.	
No. of weeks resident	52		52					
Strength	150		695					
Total admissions	195		1,048		1,300		150·8	
Daily sick	9·83		54·99		65·5		79·1	
Died in hospital	3		3		20		4·3	
Do. out of do.	...		2		...		2·8	
	A.	D.	A.	D.	A.	D.	A.	D.
Small-pox	...	...	...	...	...	...	...	...
Fevers	49	1	183	...	326·6	6·6	263·3	...
Cholera	1	...	1	...	6·6	...	1·4	...
Rheumatism	3	...	14	...	20·0	...	19·7	...
Dysentery	6	...	22	...	40·0	...	31·6	...
Diarrhœa	9	...	31	...	60·0	...	44·6	...
Hepatitis	11	1	33	1	73·3	6·6	47·5	1·4
Venereal diseases	38	...	380	...	253·3	...	546·7	...

Causes of death.

92. The fatal cases are thus entered:—Enteric fever 1, phthisis 1, aneurism 2, bronchitis 1, hepatic disease 2, and gunshot wound self-inflicted 1.

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Cannanore.

Latitude, 11° 54′.
Longitude, 75° 25′.
Height above sea, 15 to 30 feet.
Mean temperature, 78°.
Average rainfall, 120 inches.
Rainfall in 1877, 120 do.

Strength, sickness, and mortality.

93. The strength of the troops was 634, the total admissions 652, average daily sick 32·3, and deaths 8. Four of these deaths occurred out of hospital.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years' average.	1197·9	53·4	15·8
1877	1028·3	51·01	12·6

94. The proportions of sickness and mortality are contrasted in the margin with the result of eleven previous years. The figures are favorable to the results of 1877.

Composition of force.

95. The following table shows the composition of the force and the sickness and mortality in each corps. No case of cholera occurred in the European force, but the disease was epidemic in the neighboring town of Old Cannanore for some months. There was no mortality from typhoid fever, nor does there appear to have been a case of the disease treated in the station. I note this with reference to the fact that two regiments, H.M.'s 89th and 43rd Light Infantry, suffered severely on first landing at this station from England from fevers of a continued or typhoid type, and the 48th Regiment having undergone a process of acclimatization at Bellary before reaching Cannanore, has not so suffered.

—	Corps.						Ratio per 1,000 of Strength.					
	48th Regiment.		13-8th Brigade R. A.		Garrison.		48th Regiment.		13-8th Brigade R. A.		Garrison.	
No. of weeks resident ...	52		52		52							
Strength	559		75		10							
Total admissions ...	553		99		4		989·3		1,320		400	
Daily sick	26·75		6·59		0·14		47·8		87·8		14	
Died in hospital ...	3		1		...		5·3		13·3		...	
Do. out of do. ...	3		1		...		5·3		13·3		...	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Small-pox	...	...	...	...	...	...	...	...	...	...	...	...
Fevers	176	...	30	...	...	...	314·8	...	400	...	...	...
Cholera	...	...	...	...	...	...	...	...	...	...	...	...
Rheumatism	11	...	1	...	1	...	19·7	...	13·3	...	100	...
Dysentery	56	...	8	...	...	...	100·2	...	106·6	...	...	...
Diarrhœa	35	...	5	...	...	...	62·6	...	66·6	...	...	...
Hepatitis	49	2	6	...	1	...	87·6	3·6	80	...	100	...
Venereal diseases ...	46	...	9	...	...	...	82·3	...	120	...	...	...

Causes of death.

96. The causes of death in the fatal cases were aneurism 1, abscess 1, hepatic disease 2, drowning 3, and gun-shot wound suicidal 1.

Calicut.

Latitude, 11° 15′.
Longitude, 75° 52′.
Mean temperature, 78°.
Average rainfall, 114 inches.
Rainfall in 1877, 129 do.

97. The station was occupied by a detachment of H.M.'s 48th Regiment during the year.

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Strength, sickness, and mortality.

98. The strength of the troops was 97, the hospital admissions 94, average daily sick 4·1, and deaths 2.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years' average	977·6	45·3	16·3
1877 ...	969·1	42·6	20·6

99. The ratios of admissions, daily sick and mortality are contrasted marginally with the results of eleven previous years. The mortality has been rather above the average.

Causes of death.

100. The causes of death were dysentery 1 and hepatitis 1.

Kamptee.

Latitude, 21° 16′.
Longitude, 79° 14′.
Height above sea, 1,500 feet.
Average rainfall, 58 inches.
Rainfall in 1877, 42 do.

Strength, sickness, and mortality.

101. The mean strength of troops at this station was 830, total admissions 1,001, average daily sick 36·6, and deaths 5. One of the deaths occurred out of hospital.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years' average.	1722·2	64·5	16·4
1877 ...	1206·0	41·2	6·0

102. The proportions of sickness and mortality during the year are contrasted with the results of eleven previous years. There has been a very marked decrease both in the proportion of admissions and deaths during the past year. There was no cholera in the European branch of the force, and only a few cases amongst Natives. The principal causes of admission were mild fevers and venereal diseases.

Composition of force.

103. The following table shows the composition of the force:—

—	Corps.								Ratio per 1,000 of Strength.							
	E-6th Brigade R. A.		G-6th Brigade R.A.		H.M.'s 33rd Regiment.		Garrison.		E-6th Brigade R.A.		G-6th Brigade R.A.		H.M.'s 33rd Regiment.		Garrison.	
No. of weeks resident.	52		52		52		52									
Strength	129		130		571		11									
Total admissions ...	182		216		603		2		1410·9		1661·5		1056·0		181·8	
Daily sick	5·03		6·96		24·69		0·09		38·9		53·5		43·2		8·2	
Died in hospital ...	1		...		3		...		7·7		...		5·2		...	
Do. out of do. ...	...		1		...		...		...		7·7		...		...	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Small-pox	...	...	...	...	1	...	...	...	...	...	...	...	1·7	...	...	...
Fevers	52	...	60	...	215	...	...	...	4 031	...	461·5	...	376·5	...	...	...
Cholera	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Rheumatism ...	7	...	8	...	9	..	...	...	54·2	...	61·5	..	15·7	...	...	...
Dysentery	2	...	3	...	16	...	...	...	15·5	...	23·1	...	28·0	...	...	...
Diarrhœa	11	...	11	...	12	...	...	...	85·2	...	84·6	...	20·9	...	...	...
Hepatitis	6	...	5	...	9	...	...	...	46·5	...	38·4	...	15·7	...	...	...
Venereal diseases ...	24	...	24	...	147	...	...	...	186·1	...	184·5	...	257·4	...	...	...

Causes of death.

104. The causes of death recorded in the fatal cases were sunstroke 1, apoplexy 2, and heart disease 2.

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Madras (Fort St. George).

Latitude, 13° 4′.
Longitude, 80° 22′.
Height above sea, 5 to 15 feet.
Mean temperature, 82°.
Average rainfall, 47 inches.
Rainfall in 1877, 66·2 do.

Strength, sickness, and mortality.

105. The strength of the British troops in garrison was 646, the hospital admissions 618, the average daily sick 32·64, and deaths 13. Two of the deaths occurred out of hospital.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years' average.	1444·5	73·6	18·5
1877 ...	956·6	50·5	20·1

106. The proportion of admissions, daily sick and deaths are here contrasted with the results of eleven previous years. There has been a very satisfactory decrease in the proportion of the sickness in 1877, and this is the more noticeable inasmuch as the native population almost throughout the year was continually afflicted with cholera, small-pox and diseases of privation, and the general sanitary arrangements of the town were much impeded by the enormous influx of starving poor from the surrounding country. It is thought that during the period of greatest famine pressure we had, at the least, 200,000 persons in the town beyond the normal population, and many of these without shelter or house-accommodation of any kind. The town death-rate for the year calculated on the normal population rose to 118·0 per mille, and in the month of March was in the ratio of 151·6 per mille per annum.

Composition of force.

107. The following table shows the composition of the force:—

—	Corps.						Ratio per 1,000 of Strength.					
	Details of various Corps.		67th Regiment.		11/8th Brigade Royal Artillery.		Details of various Corps.		67th Regiment.		11/8th Brigade Royal Artillery.	
No. of weeks resident...	52		52		7							
Strength	31		588		48		...		...		...	
Total admissions	37		564		17		1193·5		959·2		354·2	
Daily sick	2·82		29·60		1·67		90·9		50·3		34·8	
Died in hospital ...	3		6		2		96·8		10·2		41·7	
Do. out of do. ...	2		...		...		64·5		...		...	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Small-pox	...	...	...	...	...	...	...	...	...	...	...	...
Fevers	4	...	55	...	...	...	129·0	...	93·5	...	...	...
Cholera	...	...	3	3	...	...	...	...	5·1	5·1	...	...
Rheumatism	1	...	16	...	...	...	32·2	...	27·2	..	...	...
Dysentery	4	2	25	1	1	...	129·0	64·5	42·5	1·7	20·8	...
Diarrhœa	4	1	30	...	...	...	129·0	32·2	51·1	...	...	...
Hepatitis	2	...	22	1	...	...	64·5	...	37·4	1·7	...	...
Venereal diseases ...	11	...	169	...	1	...	354·8	...	287·4	...	20·8	...

Cholera.

108. There were 3 admissions and 3 deaths from cholera. The disease was raging in Madras in January and February. The first case occurred in January in H.M.'s 67th Regiment, of a man who was seized while in hospital.

In the fourth week another case occurred amongst the Details, and in the fifth week a man and woman of the 67th Regiment were attacked, but the disease did not appear in epidemic form, and consequently the barracks in the Fort were not vacated.

Venereal diseases.

109. Venereal diseases have been more prevalent than usual, and chiefly amongst the men of the 67th Regiment. This perhaps is scarcely to be wondered at, when we know that crowds of strange women

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from the country bivouacked nightly on the esplanades around the Fort, and that no system of registration could bring persons of this description under control.

Causes of death.

110. The causes of death were cholera 3, phthisis 1, sunstroke 1, dysentery 4, diarrhœa 1, hepatitis 1, drowning 1, and aneurism 1.

Malliapooram.

Latitude, 11° 3′.
Longitude, 76° 9′.
Average rainfall, 81 inches.
Rainfall in 1877, 102 do.

Strength, sickness, and mortality.

111. The mean strength of the detachment of H.M.'s 48th Regiment at this station was 94, the hospital admissions 84, average daily sick 2·8, and death 1.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years' average.	880·3	41·5	13·1
1877	893·6	30·7	10·6

112. The ratios of sickness and mortality are contrasted here with the results of eleven previous years. These results are on the whole favorable.

The 1 death was caused by hepatic abscess.

Principal diseases.

113. The following table shows the chief diseases during the year:—

——	Corps. Detachment, 48th Regiment.		Ratio per 1,000 of Strength. Detachment, 48th Regiment.	
No. of weeks resident	52			
Strength	94			
Total admissions	84		893·6	
Daily sick	2·89		30·7	
Died in hospital	1		10·6	
Do. out of do.	...		...	
	A.	D.	A.	D.
Small-pox	...	...	...	...
Fevers	19	...	202·0	...
Cholera	...	...	...	...
Rheumatism	2	...	21·3	...
Dysentery	11	...	117·02	...
Diarrhœa	3	...	31·9	...
Hepatitis	4	1	42·5	10·6
Venereal diseases	11	...	117·02	...

Poonamallee (Invalid Depot).

Latitude, 13° 0′.
Longitude, 80° 10′.
Mean temperature, 80°.
Average rainfall,—
Rainfall in 1877,—

Strength, sickness, and mortality.

114. The average strength of the men at this depôt was 155, the total admissions 392, the average daily sick 41·1, and deaths 10.

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115. The ratios are contrasted in the margin with the results of the previous eleven years. The ratios are very high as might be expected of a depôt receiving invalids from other stations preparatory to embarkation for Europe. But the results of 1877 do not differ materially from the average of former years.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years' average.	2759·7	227·9	63·1
1877	2529·0	265·1	64·5

Causes of death.

116. The causes of death were enteric fever 1, cholera 1, phthisis 1, dysentery 1, hepatic diseases 5, and cirrhosis of liver 1.

Port Blair.

Latitude, 12° 0′.
Longitude, 92° 50′.
Average rainfall, 115 inches.
Rainfall in 1877, 115 do.

Strength, sickness, and mortality.

117. The strength of the European detachment was 134, the total hospital admissions 85, the average daily sick 3·6, and deaths 2.

118. The proportions of sickness and mortality were as follows, compared with the results of previous eleven years. It is worthy of notice that the station of Port Blair occupies almost the head of the list of stations, showing the least sickness of European troops, and during the year the proportion of admissions and daily sick was much below the average.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years' average	950·2	36·3	11·3
1877	634·3	26·8	15·0

The detachment consisted of men of the regiment from Rangoon.

Causes of death.

119. The causes of death were enteritis 1, and drowning 1.

Ramandroog Depot.

Latitude, 15° 8′.
Longitude, 76° 33′.
Average rainfall,—
Rainfall in 1877,—

120. This depôt is maintained chiefly on account of the troops serving at Bellary, to whom it affords a pleasant and healthful change for weakly or convalescent men. Probably the low death-rate of the Bellary force for many years past has been favorably influenced by convenient access to this small sanatorium.

Strength, sickness, and mortality.

121. In the past year the mean strength of the depôt was 58, the hospital admissions 63, and average daily sick 4·08. No deaths occurred during the year.

Rangoon.

Latitude, 16° 46′.
Longitude, 96° 20′.
Height above sea, 80 feet.
Mean temperature,
Average rainfall, 114 inches.
Rainfall in 1877, 102 do.

Strength, sickness, and mortality.

122. The mean strength of the troops was 749, the hospital admissions numbered 850, the average daily sick 41·6, and deaths 18. Two of the deaths took place out of hospital.

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123. While the proportion of sickness to strength has been somewhat below, the deaths have been in excess of the average of eleven years, as shown in the margin. Rangoon appears to have been unhealthy during the year. Cholera prevailed amongst the Native community, but no cases occurred amongst the European troops. Dysentery appears to have been unusually prevalent and fatal, causing 9 deaths.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years' average.	1291·1	56·0	13·7
1877	1134·3	55·5	24·0

Composition of force.

124. The following table shows the composition and sickness in each corps :—

—	Corps.												Ratio per 1,000 of Strength.											
	12/8th Brigade R. A.		7/8th Brigade R. A.		Detachment, 89th Regiment.		1/21st Fusiliers.		10/8th Brigade R. A.		Garrison.		12/8th Brigade R. A.		7/8th Brigade R. A.		Detachment, 89th Regiment.		1/21st Fusiliers.		10/8th Brigade R. A.		Garrison.	
No. of weeks resident.	52		12		8		50		41		52													
Strength	55		42		296		616		82		29													
Total admissions ...	64		13		12		627		134		11		1163·6		309·5		40·5		1017·8		1634·1		379·3	
Daily sick	2·67		2·85		3·09		31·42		7·45		0·34		48·5		67·8		10·4		51·0		90·8		11·7	
Died in hospital ...	1		...		...		12		3		1		18·1		...		...		19·4		36·6		34·5	
Do. out of do. ...	...		...		...		2		...		...		...		...		...		3·2		...		...	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Small-pox	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Fevers	3	...	3	...	...	...	51	...	17	...	1	...	54·5	...	71·4	...	...	...	82·7	...	207·3	...	34·5	...
Cholera	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Rheumatism ...	...	...	2	...	1	...	25	...	3	..	3	...	...	...	47·6	...	3·4	...	40·5	...	36·6	...	103·4	...
Dysentery	10	1	3	...	2	...	120	6	21	2	1	...	181·8	18·1	71·4	...	6·8	...	194·8	9·6	256·1	24·4	34·5	...
Diarrhœa	6	...	1	...	...	...	16	1	6	...	...	...	109·1	...	23·8	...	...	...	25·9	1·6	73·2	...	...	...
Hepatitis	2	...	...	...	1	...	45	...	2	1	...	...	36·3	...	...	...	3·4	...	73·0	...	24·4	12·2	...	...
Venereal diseases ...	4	...	...	...	2	...	118	...	19	...	...	...	72·7	...	...	...	6·8	...	191·5	...	213·7	...	...	...

Causes of death.

125. The causes of death were dysentery 9, diarrhœa 1, sunstroke 1, apoplexy 1, heart disease 1, hepatitis 1, drowning 1, injuries of the head 2, epilepsy 1, and debility 1.

Saint Thomas' Mount.

Latitude, 13° 0′.
Longitude, 80° 15′.
Height above sea, 40 feet.
Mean temperature, 81°.
Average rainfall, 57 inches.
Rainfall in 1877, 69 do.

Strength, sickness, and mortality.

126. The mean strength of the Royal Artillery at this station was 321, the hospital admissions 474, daily sick 19·22, and deaths 7.

127. The proportions of sickness and mortality are contrasted marginally with the results of previous years. The admissions have been in excess of the average, but the deaths slightly below. Venereal diseases were unusually prevalent, and apparently from the same cause as at Madras, the influx of famine wanderers into the station.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years' average.	1310·7	64·2	22·7
1877	1476·6	59·9	21·8

Composition of force.

128. The composition of the force is shown below :—

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	Corps.										Ratio per 1,000 of Strength.									
—	Hd. Qrs. 5th Brigade R. A. and Details.		A-20th Brigade R. A.		C-6th Brigade R. A.		11-8th Brigade R. A.		O-1st Brigade R. A.		Hd. Qrs. 5th Brigade R. A. and Details.		A-20th Brigade R. A.		C-6th Brigade R. A.		11-8th Brigade R. A.		O-1st Brigade R. A.	
No. of weeks resident.	52		7		52		39		38											
Strength	16		30		129		58		143		...		...		...		...		...	
Total admissions ...	18		20		207		66		163		112·5		153·8		1604·6		1137·9		1139·9	
Daily sick	1·40		5·47		8·17		2·77		8·81		87·5		42·1		63·3		47·7		61·6	
Died in hospital ...	...		1		3		1		2		...		7·7		23·2		17·2		13·9	
Do. out of do. ...	...		...		...		...		...		...		...		...		...		...	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Small-pox	...	...	...	...	1	..	...	...	...	...	...	...	...	...	7·8	...	...	...	...	...
Fevers	6	...	3	...	29	1	10	...	37	...	375·0	...	23·1	...	224·8	7·8	172·4	...	258·7	...
Cholera	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	7·0	...
Rheumatism	1	...	...	...	15	1	...	...	5	...	62·5	...	...	...	116·1	7·8	...	...	34·9	...
Dysentery	1	...	3	...	13	...	5	...	4	...	62·5	...	23·1	...	100·7	..	86·2	...	27·9	...
Diarrhœa	...	...	...	...	14	.	3	...	7	...	...	...	...	...	108·5	...	51·7	...	48·9	...
Hepatitis	2	...	3	1	6	1	9	...	7	...	125·0	...	23·1	7·7	46·8	7·8	155·1	...	48·9	...
Venereal diseases ...	4	...	4	...	43	...	6	...	39	...	250·0	...	30·8	...	333·3	...	103·4	...	272·7	...

Causes of death.

129. The causes of death were enteric fever 1, acute rheumatism 1, phthisis 1, sunstroke 1, and hepatic disease 3.

Secunderabad.

Latitude, 17° 22′.
Longitude, 78° 35′.
Height above sea, 1,800 feet.
Mean temperature, 79°.
Average rainfall, 26 inches.
Rainfall in 1877, 31 do.

Strength, sickness, and mortality.

130. The mean strength of the European force was 2,401, the total hospital admissions 2,896, the daily sick 138·3, and the deaths 37. Five deaths occurred out of hospital.

131. The proportion of sickness and mortality are shown in the margin compared with the results of the previous years. There has been a very considerable reduction in the past year both in sickness and mortality. Notwithstanding the fact that the Native populations were severely visited by cholera and small-pox, only a few cases of cholera occurred, chiefly in the newly arrived corps of the 12th Lancers, and nine deaths are returned from "enteric" fever. The number and fatality of cases of dysentery and hepatitis was much below the average. Greater exertions were made to bring on the registers women of the prostitute class, but there were more admissions than usual from venereal diseases.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years' average	1279·7	58·4	25·7
1877	1206·1	57·6	15·3

Composition of force.

132. The following table shows the composition of the force:—

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—	Corps.																					
	Detail of H. M.'s 16th Lancers.		Detachment 1-21st Fusiliers.		B-B Brigade R. A.		H-1st Brigade R. A.		Head Quarters 20th Brigade R. A. and Details.		F-6th Brigade R. A.		9-8th Brigade R. A.		44th Regiment.		2-16th Regiment.		H. M.'s 12th Lancers.		Garrison.	
No. of weeks resident ...	6		3-7		52		52		52		52		51		47		52		47		52	
Strength	30		61		143		145		14		144		81		715		825		426		35	
Total admissions	...		19		209		174		24		174		104		889		921		382		48	
Daily sick	1·66		0·86		9·87		10·34		2·18		9·04		4·21		42·36		42 79		23·88		2·21	
Died in hospital	...		...		1		2		1		1		...		14		8		5		...	
Do. out of do.	...		...		...		...		...		...		...		2		1		2		1	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Small-pox	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...
Fevers	...	...	1	...	11	1	25	...	5	...	26	...	30	...	217	4	160	4	53	...	5	...
Cholera	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	1	...	5	2	...	...
Rheumatism	...	...	...	...	12	...	4	...	...	...	4	...	3	...	4	...	19	...	11	...	2	...
Dysentery	...	...	...	...	16	...	5	1	1	...	4	1	1	...	66	...	35	1	16	...	6	...
Diarrhœa	...	...	...	...	13	...	8	...	2	...	8	...	5	...	92	...	79	...	54	...	4	...
Hepatitis	...	...	...	...	18	...	8	...	4	...	7	...	6	...	49	4	17	1	14	1	6	...
Venereal diseases	...	...	15	...	30	...	31	...	5	...	35	...	19	...	155	...	162	...	75	...	2	...
Ratio per 1,000 of Strength.																						
Total admissions	...		311·4		1461·5		1,200		1714·3		1208·3		1283·9		1243·3		1116·3		896·7		1371·4	
Daily sick	55·3		14·1		69·0		71·3		155·7		62 8		51·9		59·2		51·8		56·0		63·1	
Died in hospital	...		...		6·9		13·8		71·4		6·9		...		19·5		9·7		11·7		...	
Do. out of do.	...		...		...		...		...		...		...		2·8		1·2		4·7		28·6	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Small-pox	...	...	...	...	...	6·9	...	...	...	...	...	...	...	...	...	...	...	...	2·3	...	...	...
Fevers	...	...	16·4	...	76·9	...	172·4	...	357·1	...	180·5	...	370·4	...	303·5	5·6	193·9	4·8	124·4	...	142·9	...
Cholera	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1·4	1·4	1·2	...	11·7	4·7	...	...
Rheumatism	...	...	...	...	83·9	...	27·5	...	...	...	27·7	...	37·0	...	5·6	...	23·0	...	25·8	...	57·2	...
Dysentery	...	...	...	...	111·8	...	34·5	6·9	71·4	...	27·7	6·9	12·3	...	92·3	...	42·4	1·2	87·5	...	171·5	...
Diarrhœa	...	...	...	...	90·9	...	55·1	...	142·8	...	55·5	...	61·7	...	128·6	...	95·7	...	126·7	...	114·4	...
Hepatitis	...	...	...	...	125 8	...	55·1	...	285·7	...	48·6	...	74·1	...	68·5	5·6	20·6	1·2	32 8	2·3	171·5	...
Venereal diseases	...	...	245·9	...	209·8	...	213·8	...	357·1	...	243·1	...	234·6	...	216·7	...	196·3	...	176·0	...	57·2	...

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Causes of death.

133. Enteric fever 9, cholera 3, phthisis 4, sunstroke 2, apoplexy 1, aneurism 1, dysentery 3, hepatic diseases 6, sloughing phagedœna 1, gunshot wound 1, gunshot wound self-inflicted 4, drowning 1, and debility 1.

Seetabuldee.

Latitude, 21° 10′.
Longitude, 79° 9′.
Height above sea, 939 feet.
Average rainfall, 41 inches.
Rainfall in 1877, 57 do.

Strength, sickness, and mortality.

134. The troops at this station consisted of a detachment of 33rd Regiment averaging 49 in strength, with an admission list of 84, and one death occurred amongst them from concussion of brain.

Trichinopoly.

Latitude, 10° 52′.
Longitude, 78° 46′.
Height above sea, 250 feet.
Mean temperature, 83°.
Average rainfall, 35 inches.
Rainfall in 1877, 37 do.

Strength, sickness, and mortality.

135. The mean strength of the troops was 285, the hospital admissions were 445, the daily sick 20·92, and deaths 4.

136. The ratio of sickness to strength was higher than usual, though the mortality was below the average of the last eleven years, as shown marginally. Fevers and venereal diseases were the chief causes of admissions.

	Admissions.	Daily Sick.	Deaths.
11 years' average.	1283·4	70·9	18·9
1877	526·3	73·4	14·03

Composition of force.

137. The following table shows the composition of the force:—

—	Corps.				Ratio per 1,000 of Strength.			
	L-1st Brigade R. A.		Detachment 67th Regiment.		L-1st Brigade R. A.		Detachment, 67th Regiment.	
No. of weeks resident	52		52					
Strength	136		149					
Total admissions	203		242		1492·6		1624·1	
Daily sick	9·94		10·98		73·08		73·7	
Died in hospital	1		3		7·3		20·1	
Do. out of do.	...		...		...		...	
	A.	D.	A.	D.	A.	D.	A.	D.
Small-pox	...	...	...	...	...	...	...	...
Fevers	20	...	55	2	147·06	...	369·1	13·4
Cholera	...	...	...	...	...	...	...	...
Rheumatism	6	...	6	...	44·1	...	40·2	...
Dysentery	3	...	6	...	22·06	...	40·2	...
Diarrhœa	14	...	16	...	102·9	...	107·3	...
Hepatitis	10	1	12	...	73·5	7·3	80·5	...
Venereal diseases	49	...	50	...	360·3	...	335·6	...

Causes of death.

138. The causes of death were fevers 2, abscess of liver 1, and injury of the head 1.

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Thayetmyo.

Latitude, 20° 18′.
Longitude, 92° 46′.
Height above sea, 240 feet.
Mean temperature, 80°.
Average rainfall, 46 inches.
Rainfall in 1877, 62 do.

Strength, sickness, and mortality.

139. The strength of the troops at this station was 572, the hospital admissions 640, the daily sick 22·4, and deaths 12.

140. The proportion of sickness and mortality are shown in the margin, contrasted with the results of the previous eleven years. This station, but for the liability of the troops to fatal cholera outbreaks, would be a very healthy one. During the past year cholera prevailed epidemically in September, causing just one half of the whole mortality of the white troops.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years' average	1194·4	46·8	21·1
1877	1118·8	39·1	20·9

Composition of force.

141. The following table shows the sickness and mortality in each part of the force:—

—	Corps.										Ratio per 1,000 of Strength.									
	G-9th Brigade R. A.		44th Regiment.		89th (P. V.) Regiment.		K-1st Brigade R. A.		12-8th Brigade R. A. and Details.		G-9th Brigade R. A.		44th Regiment.		89th (P. V.) Regiment.		K-1st Brigade R. A.		12-8th Brigade R. A. and Details.	
No. of weeks resident	8		2		51		39		52											
Strength	132		289		412		140		31											
Total admissions ...	16		36		356		201		31		121·2		124·5		864·1		1435·7		1000·0	
Daily sick	4·58		15·92		13·47		9·15		2·00		34·7		55·1		32·7		65·4		64·5	
Died in hospital ...	...		...		5		7		...		...		...		12·1		50·0		...	
Do. out of do. ...	...		...		...		...		...		...		...		...		...		...	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Small-pox	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Fevers	2	...	7	...	46	...	12	...	2	...	15·1	...	24·2	...	111·6	...	85·7	...	64·5	...
Cholera	...	...	...	...	5	2	5	4	...	...	...	...	...	...	12·1	4·8	35·7	28·6	...	...
Rheumatism ...	1	...	...	...	13	...	3	...	...	...	7·6	...	...	...	31·5	...	21·4	...	...	...
Dysentery	...	...	...	...	15	...	3	...	1	...	...	...	...	...	36·4	...	21·4	...	32·2	...
Diarrhœa	...	...	5	...	25	...	14	...	6	...	...	...	17·3	...	60·6	...	100.0	...	193·5	...
Hepatitis	2	...	1	...	20	1	11	1	1	...	15·1	...	3·5	...	48·5	2·4	78·5	7·1	32·2	...
Venereal disease ...	5	...	9	...	30	...	18	...	4	...	37·8	...	31·1	...	72·8	...	128·5	...	129·0	...

Causes of death.

142. Cholera 6, phthisis 1, sunstroke 1, aneurism 1, liver disease 2, and alcoholic poisoning 1.

Tonghoo.

Latitude, 18° 47′.
Longitude, 96° 57′.
Height above sea, 300 feet.
Mean temperature, 79°.
Average rainfall, 69 inches.
Rainfall in 1877, 77 do.

Strength, sickness, and mortality.

143. The strength of the force was 417, the total admissions 450, the daily average sick 19·71, and deaths 8; of which 2 occurred out of hospital.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years' average.	1145·8	49·7	15·6
1877 ...	1079·1	47·2	19·2

144. The proportion of sickness and mortality are shown in the margin contrasted with the figures of the preceding eleven years. The mortality in 1877 has been in excess of the

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average, and due apparently to unusual heat, or atmospheric causes tending to heat apoplexy or insolation.

Composition of force.

145. The following table shows sickness and mortality in each part of the force :—

—	Corps.			Ratio per 1,000 of Strength.		
	14-8th Brigade R. A.	8-8th Brigade R. A.	Left Wing 89th Regiment.	14-8th Brigade R. A.	8-8th Brigade R. A.	Left Wing 89th Regiment.
No. of weeks resident ...	50	52	52			
Strength	66	70	283			
Total admissions	79	75	296	1196·9	1071·4	1045·9
Daily sick	3·70	4·23	11·91	56·0	60·4	42·1
Died in hospital	2	1	3	30·3	14·3	10·6
Do. out of do.	...	...	2	...	...	7·0

	14-8th Brigade R. A.		8-8th Brigade R. A.		Left Wing 89th Regiment.		14-8th Brigade R. A.		8-8th Brigade R. A.		Left Wing 89th Regiment.	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Small-pox	...	...	...	...	1	...	...	...	...	...	3·5	...
Fevers	11	...	6	..	52	...	166·6	...	85·7	...	183·7	...
Cholera	...	...	...	...	...	...	...	...	...	...	...	...
Rheumatism	1	...	1	...	7	...	15·1	...	14·3	...	24·7	...
Dysentery	12	...	16	...	18	...	181·6	...	...	...	63·6	...
Diarrhœa	5	...	5	...	32	...	75·6	...	71·4	...	113·0	...
Hepatitis	12	...	6	1	15	...	181·6	...	85·7	14·3	53·0	...
Venereal diseases ...	9	...	9	...	36	...	136·3	...	128·5	...	127·2	...

Causes of death.

146. Sunstroke 3, congestion of lungs 1, hepatic disease 1, tetanus 1, gunshot wound self-inflicted 1, and drowning 1.

Wellington Depot.

Latitude, 11° 25'.
Longitude, 77° 5'.
Height above sea, 6,000 feet.
Mean temperature,
Average rainfall, 46·75 inches.
Rainfall in 1877, 65·88 do.

Strength, sickness, and mortality.

147. The mean strength of the troops at this hill depôt was 523, the total hospital admissions 923, the average daily sick 53·6, and deaths 16.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years' average	1376·0	76·3	16·7
1877 ...	1764·8	102·5	30·6

148. The proportions of sickness and mortality are shown in the margin. This station has had the heaviest sick list of any in 1877, excepting the invalid depôt of Poonamallee. The mortality rate also has been higher than in any other station except St. Thomas' Mount. Experience has always shown that seasons of great dearth and drought in the plains of India are very dangerous to health in the elevated mountain plateaux, and the experience of the past year has proved the general accuracy of the conclusion. All the hill stations of the Neilgherries were unhealthy in 1877, and cholera for the first time in half a century prevailed for several weeks as an epidemic in Ootacamund and Coonoor, while small-pox and fevers were rife amongst the Native inhabitants who suffered greatly from the drought and scarcity of food. In June the medical officer at Wellington reported that fevers of a severe type with head symptoms and high temperature were prevalent.

Composition of force.

149. The following table shows the composition of the force :—

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—	Corps.				Ratio per 1,000 of Strength.			
	Convalescent Depôt (Effective).		Convalescent Depôt (Invalid).		Convalescent Depôt (Effective).		Convalescent Depôt (Invalid).	
No. of weeks resident	52		52					
Strength	10		513					
Total admissions	13		910		1,300		1773·8	
Daily sick	0·21		53·41		21		104·1	
Died in hospital	...		16		...		31·1	
Do. out of do.	...		...		...		...	
	A.	D.	A.	D.	A.	D.	A.	D.
Small-pox	...	...	...	...	...	...	...	...
Fevers	...	...	226	3	...	...	440·5	5·8
Cholera	...	...	2	1	..	...	3·9	1·9
Rheumatism	..	...	23	...	...	...	44·8	...
Dysentery	1	...	53	...	100	...	103·3	...
Diarrhœa	...	...	59	...	...	...	115·0	...
Hepatitis	2	...	54	2	200	...	105·2	3·8
Venereal diseases	1	...	70	...	100	...	136·4	...

Causes of death.

150. The causes of death were enteric fever 3, cholera 1, sunstroke 1, heart disease 2, pneumonia 1, hepatic diseases 2, abscess of spleen 1, concussion of brain 1, meningitis 2, cancer 1, and cystic tumour of brain 1.

SECTION III.

NATIVE ARMY.

Strength according to Adjutant-General's Returns.

151. The Adjutant-General's returns show that on the 1st of January 1877 the Madras Native Army numbered 31,000 men, and that during the year the strength was increased by addition of recruits, transfers, &c., to 1,969. During the same period the total decrease was 1,759, including 944 men transferred to the invalid pension establishment, 201 summary dismissals, 42 discharged by sentence of courts-martial, 56 desertions, 471 deaths, and 45 who left from other causes. On the 1st January 1878 the strength of the Native Army stood at 31,210.

Deaths and invaliding.

152. The following table shows the deaths and invaliding for a series of years in the entire Native Army :—

—	Ratio per 1,000 of Strength.									
	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.
Deaths	14·2	16·5	13·7	11·0	12·9	9·8	10·4	12·0	13.1	15·2
Invaliding	16·4	24·5	25·6	23·3	28·4	30·8	33·5	39·3	37·1	30·5

153. But some seven or eight regiments of the Madras force are serving beyond the Madras command, and the particulars in regard to these regiments are not included in the medical returns for which the stational statistics are framed.

Strength, sickness, and mortality according to Stational Returns.

154. According to the weekly returns of strength and sick received in this office, the mean annual strength of the portion of the Madras Army within the Madras command was 26,866. In this force the total hospital admissions of the year were 22,360, and the average number of daily sick 775·56; while the deaths in and out of hospital were

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351. The difference in the mortality of these figures and the Adjutant-General's returns is to be explained by the non-inclusion in our figures of the statistics of the regiments serving in Bengal, and some deaths of men absent from their regiments on furlough are not accounted for in the weekly returns of sick submitted to this office, while they are included in the Adjutant-General's figures.*

Comparison with former years of sickness and mortality.

155. The following table shows, in a comparative view, the proportion of admissions, daily sick, and deaths in and out of hospital in the Native troops within the Madras command from 1868 to 1877 inclusive:—

—	Ratio per 1,000 of Strength.									
	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.
Admissions	707·7	702·5	630·6	693·9	1067·9	883·2	772·7	777·7	726·8	832·2
Daily sick	29·0	29·3	26·4	26·9	34·7	31·3	30·0	30·7	28·2	28·8
Deaths in hospital ...	8·6	10·1	9·4	8·8	9·9	6·4	7·7	9·0	9·8	11·3
Do. out of do. ...	1·4	3·6	3·6	1·8	2·4	1·8	2·0	1·5	1·2	1·7

156. It will be observed that the mortality has been higher in 1877 than in any year since 1870.

The causes are not very far to seek. The Native Army, like all other classes of the Indian population, has felt severely the pressure of scarcity and high prices during the great famine year. It is true that money compensation is afforded to the Native soldier when the price of his staple food is above a certain average, but at the same time he is, in these periods of scarcity, spunged upon by every needy kinsman who has the smallest claim on his hospitality, and, as a matter of fact, he but too often stints himself of his proper nutriment to help those who are otherwise destitute, and thus, by enfeebling his health, becomes an easy prey to epidemic or other disease. The conditions under which the Native troops live approach nearly to those of the civil Native population, and any causes acting prejudicially on the health of the latter will probably affect the former in some degree. Famine and pestilence have, in the past year, affected the civil population in a degree never before witnessed by the present generation, and we shall find that the Native troops have not escaped altogether unscathed. Cases of small-pox occurred in 16 out of the 44 stations occupied permanently or temporarily by the Native Army, and cholera in 20 out of 44 stations.

157. Of small-pox there were 99 cases and one death out of hospital, showing that, however prevalent the disease might have been, the Native Army was fairly protected by vaccination. Of cholera there were 190 admissions into hospital and 80 deaths. The most numerous admissions occurred in Madras, Vellore, Trichinopoly, Bangalore, Bellary, French Rocks, and Secunderabad, and in all these localities cholera was very severe amongst the civil population.

Stational sickness and mortality compared with mean of former years.

158. In the following table the proportions of sickness and mortality have been arranged in groups of stations to show the ratios, admissions, and deaths compared with the results of former years:—

* 69 such deaths appear to have been excluded. All these deaths ought to have been shown in the weekly returns as deaths "out of hospital," but as they occurred in men on furlough the reports do not appear to have reached the medical officers of regiments. Better arrangements are needed for having such deaths included in the weekly hospital returns.

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Locality.	Stations.	Mean Ratios of previous 11 Years ending 1876.		Ratio per Mille for 1877.	
		Admitted.	Died.	Admitted.	Died.
Eastern Coast ...	Madras	669·9	11·2	610·1	16·5
	Vizagapatam	727·9	12·1	517·5	6·7
	Saint Thomas' Mount	564·4	8·7	398·8	...
	Palaveram	1444·3	40·4	895·0	20·5
	Mean ...	851·6	18·1	605·3	10·9
Western Coast ...	Mangalore	480·3	9·2	368·8	7·8
	Quilon	495·5	7·8	355·2	16·4
	Trevandrum	*418·6	*3·8	743·2	...
	Cannanore	402·8	7·1	786·9	3·1
	Mean ...	448·1	6·9	540·6	6·8
Plains near the Sea.	Vizianagram	592·5	10·8	1725·2	15·6
	Trichinopoly	608·0	10·9	685·9	14·8
	Berhampore	618·1	14·4	635·4	8·3
	Vellore	598·0	18·6	528·5	49·2
	Palamcottah	507·0	8·6	376·0	4·2
	Trichoor	420·2	5·2	723·2	18·8
	Cuttack	676·2	8·7	631·9	3·2
	Mean ...	574·3	11·0	758·0	16·1
Table-lands distant from the Sea.	Bellary	480·0	8·6	1038·6	18·5
	Hooshungabad	880·9	11·9	1404·2	7·8
	Raepore	999·3	12·5	497·6	7·7
	Seroncha	1471·9	9·6	954·0	5·7
	Bangalore	743·1	10·8	844·0	16·1
	Seetabuldee	1388·8	6·9	2097·9	9·2
	Secunderabad	915·7	10·7	871·9	14·3
	French Rocks	*688·8	*11·5	764·9	27·2
	Kamptee	823·4	10·0	682·5	8·7
	Mysore	†717·8	† 7·8	861·5	15·3
	Chandah	1743·8	10·2	1120·0	13·4
	Sumbulpore	1250·5	20·7	694·1	9·7
	Mean ...	1008·6	10·9	981·7	12·9
Hill Station ...	Mercara	1073·9	13·7	603·5	9·4
Foreign Stations ...	Rangoon	592·3	10·5	886·9	10·9
	Port Blair	1456·9	12·1	1938·2	12·3
	Moulmein	1075·0	13·9	1000·0	6·7
	Shoaygheen	1999·8	12·9	1941·6	...
	Tonghoo	977·2	15·8	888·5	15·5
	Thayetmyo	574·2	9·2	887·9	13·4
	Nicobars	†6840·5	†21·1	6559·3	...
	Mean ...	1859·4	13·6	2013·9	8·4

Principal causes of sickness.

159. In regard to the causes of sickness and mortality in the Native Army it may be noticed that fevers account for more than one-third of the hospital admissions, while bowel-complaints, skin diseases, rheumatism, injuries, respiratory, and venereal diseases contribute the bulk of the remaining admissions.

* Mean of 10 years. † Mean of 8 years.

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NATIVE ARMY STATIONAL STATISTICS.

Bangalore.

Strength, sickness, and mortality.

160. The average strength of the Native troops was 1,795, the hospital admissions 1,515, the average daily sick 40·5, and deaths 29 ; 4 deaths occurred out of hospital.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	743·1	26·5	10·8
1877 ...	844·0	22·6	16·1

161. The proportions of sickness and mortality are given in the margin, compared with the average of former years.

Composition of force.

162. The composition of force is shown below :—

—	Corps.								Ratio per 1,000 of Strength.							
	Garrison.		Queen's Own Sappers and Miners.		36th Regiment N. I.		Head Quarters, 23rd Regiment L. I.		Garrison.		Queen's Own Sappers and Miners.		36th Regiment N. I.		Head Quarters, 23rd Regiment L. I.	
Number of weeks resident.	52		52		52		52									
Strength	13		449		667		666									
Total admissions ...	17		298		420		780		1307·7		663·7		629·7		1,171·1	
Daily sick	1·22		8·34		12·15		18·88		93·8		18·5		18·2		28·3	
Died in hospital ...	4		7		7		7		307·7		15·6		10·5		10·5	
Do. out of do. ...	...		...		2		2		...		...		2·9		3·0	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Small-pox	...	...	10	...	1	...	1	...	...	...	22·8	...	1·3	..	1·5	...
Fevers	3	...	94	1	199	1	512	2	230·7	...	209·3	2·2	298·3	1·5	768·7	3·0
Cholera	...	...	7	3	1	...	1	1	...	...	15·6	6·7	1·5	...	1·5	1·5
Rheumatism	2	...	7	...	29	...	12	...	153·8	...	15·6	...	43·4	...	18·0	...
Dysentery	1	...	4	...	30	...	32	...	76·9	...	8·9	...	44·9	...	48·0	...
Diarrhœa	1	1	6	...	14	...	28	...	76·9	76·9	13·4	...	21·0	...	42·0	...
Hepatitis	...	...	...	...	2	...	...	...	...	...	...	...	2·9	...	...	...
Venereal diseases ...	1	...	27	...	20	...	40	...	76·9	...	60·2	...	29·9	...	60·1	...

Causes of death.

163. The causes of death were fevers 4, cholera 5, phthisis 4, dropsy 1, apoplexy 2, heart disease 3, bronchitis 2, pneumonia 1, diarrhœa 1, suicide (gunshot) 1, obstruction of bowels 2, general debility 2, and cause not known 1.

Bellary.

Strength, sickness, and mortality.

164. The mean strength of the troops at this station was 1,347, the hospital admissions 1,399, the average daily sick 47·0, and the deaths 25.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	480·0	21·7	8·6
1877 ...	1038·6	34·9	18·5

165. The proportions of sickness and mortality in the past year are contrasted in the margin with the results of eleven previous years. It will be observed that during the famine period the sickness and mortality have more than doubled.

Composition of force.

166. The following table shows the composition of the force and the principal diseases in each corps :—

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—	Corps. Garrison.	Corps. 4th Regiment L. C.	Corps. Hd. Qrs., Left Wing, 21st Regiment N. I.	Corps. 27th Regiment N. I.	Corps. E Company, Sappers and Miners.	Ratio per 1,000 of Strength. Garrison.	Ratio. 4th Regiment L. C.	Ratio. Hd. Qrs., Left Wing, 21st Regiment N. I.	Ratio. 27th Regiment N. I.	Ratio. E Company, Sappers and Miners.
Number of weeks resident ...	52	52	52	52	37					
Strength	22	301	523	455	72					
Total admissions...	15	345	483	535	21	681·8	1146·1	923·5	1175·8	291·6
Daily sick ...	0·58	7·59	20·15	17·14	1·49	26·4	25·2	38·5	37·6	20·7
Died in hospital ...	2	6	7	10	...	90·9	19·9	13·4	21·9	...
Do. out of do. ...	...	...	...	...	...	...	...	...	...	...

	Garrison. A.	Garrison. D.	4th L. C. A.	4th L. C. D.	21st N. I. A.	21st N. I. D.	27th N. I. A.	27th N. I. D.	E Company A.	E Company D.	Ratio Garrison A.	Ratio Garrison D.	Ratio 4th L. C. A.	Ratio 4th L. C. D.	Ratio 21st N. I. A.	Ratio 21st N. I. D.	Ratio 27th N. I. A.	Ratio 27th N. I. D.	Ratio E Company A.	Ratio E Company D.
Small-pox ...	1	...	1	...	1	...	3	...	...	...	45·4	...	3·3	...	1·9	...	6·5	...	...	...
Fevers	2	...	176	3	188	1	222	1	7	...	90·9	...	584·7	9·9	359·4	1·9	487·9	2·2	97·2	...
Cholera	1	1	4	2	4	2	3	2	...	...	45·4	45·4	13·2	6·6	7·6	3·8	6·5	4·4	...	...
Rheumatism ...	2	...	10	...	41	...	20	...	2	...	90·9	...	33·2	...	78·4	...	43·9	...	27·7	...
Dysentery ...	1	...	10	...	28	1	48	2	...	...	45·4	...	33·2	...	53·5	1·9	94·4	4·4	...	...
Diarrhœa ...	...	...	9	...	27	...	22	...	3	...	...	...	29·8	...	51·6	...	48·3	...	41·6	...
Hepatitis ...	...	...	...	...	2	...	2	...	...	...	...	...	...	...	3·8	...	4·4	...	...	...
Venereal diseases.	2	..	1	...	9	1	8	...	5	...	90·9	...	3·3	...	17·2	1·9	17·5	...	69·4	...

167. The causes of death were fevers 5, cholera 7, pneumonia 3, dysentery 3, bubo 1, general debility 3, melena 1, peritonitis 1, and anæmia 1.

Causes of death.

Berhampore.

Latitude, 19° 20′.
Longitude, 84° 45′.
Height above sea, 112 feet.
Average rainfall, 45·9 inches.
Rainfall in 1877, 40·3 do.

The station was occupied for the whole year by the head-quarters and right wing of 2nd Regiment N. I.

Strength, sickness, and mortality.

168. The strength of the troops was 362, the total hospital admissions 230, average daily sick 12·7, and deaths 3.

169. The proportions of sickness and mortality are contrasted in the margin. There was an outbreak of epidemic cholera in the station in November, and six cases and two deaths occurred in the regiment.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	618·1	26·7	14·4
1877 ...	635·4	35·2	8·3

Causes of death.

170. The causes of death were cholera 2 and beri-beri 1.

Cannanore.

171. The average strength of the troops was 1,282, the hospital admissions 979, the daily sick 31·45, and deaths 4. One death occurred out of hospital.

Strength, sickness, and mortality.

172. The ratios of sickness and mortality for the year are shown in the margin; while the hospital admissions have been above the average, the mortality has been singularly low. Cholera was epidemic in the cantonment and neighbouring district on two occasions during the year, but none of the troops suffered.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	402·8	16·8	7·1
1877 ...	763·9	24·5	3·1

Composition of force.

173. The following table shows the composition of the force:—

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—	Corps.						Ratio per 1,000 of Strength.					
	Garrison.		25th Regiment N. I.		9th Regiment N. I.		Garrison.		25th Regiment N. I.		9th Regiment N. I.	
Number of weeks resident ...	52		52		52							
Strength	2		637		648							
Total admissions	1		644		334		500·0		1010·9		519·4	
Daily sick	0·19		16·52		14·74		95·0		25·9		22·9	
Died in hospital	1		1		1		500·0		1·5		1·5	
Do. out of do.	...		...		1		...		...		1·5	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Small-pox	...	...	...	...	1	...	...	...	...	...	1·5	...
Fevers	1	...	182	...	72	...	500·0	...	285·7	...	111·9	...
Cholera	...	...	...	...	...	...	...	...	...	...	...	...
Rheumatism	...	...	14	...	26	...	...	...	21·9	...	40·4	...
Dysentery	...	...	18	...	20	...	...	...	28·2	...	31·1	...
Diarrhœa	...	...	24	...	15	...	...	...	37·6	...	23·3	...
Hepatitis	...	...	1	...	...	...	...	...	1·5	...	...	...
Venereal diseases	...	...	15	...	2	...	...	...	23·5	...	3·1	...

Causes of death.

174. The causes of death were phthisis 1, dropsy 1, heart disease 1, and apoplexy 1.

Chandah.

Latitude, 19° 55′.
Longitude, 79° 25′.
Average rainfall, 44 inches.
Rainfall in 1877, 33 do.

175. A detachment of the 8th Regiment N. I. occupied the station for the whole year.

Strength, sickness, and mortality.

176. The strength of the troops was 75, the total admissions 84, the daily sick 1·8, and one man died from an injury to the spine.

Cuttack.

Latitude, 20° 20′.
Longitude, 85° 57′.
Average rainfall, 60·6 inches.
Rainfall in 1877, 38·2 do.

177. The station was occupied by the 12th Regiment N. I. for the whole year.

Strength, sickness, and mortality.

178. The strength of the troops was 644, the hospital admissions 407, the daily sick 19·9, and deaths 2. One death occurred out of hospital.

179. The ratios of sickness and mortality are compared in the margin with the results of former years. The mortality has been below the average. Cholera was epidemic in the town, but did not affect the troops.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	676·2	35·1	8·7
1877 ...	631·9	30·9	3·2

Causes of death.

180. The causes of death were debility 1 and gunshot wound (suicidal) 1.

French Rocks.

Height above sea, 3,300 feet.

181. The 30th Regiment N. I. occupied the station for the whole year.

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Strength, sickness, and mortality.

182. The strength of the troops was 587, the hospital admissions 449, the daily sick 13·5, and deaths 16. One of the deaths occurred out of hospital.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
10 years ...	688·8	25·4	11·5
1877 ...	764·9	23·1	27·2

183. The ratios of sickness and mortality are shown in the margin compared with the results of ten previous years. Here, again, the mortality in the heart of the famine district of Mysore has been much in excess of the usual death-rate. An epidemic of cholera appeared in the regiment in January, the disease being prevalent in all the surrounding country, and later in the year malarious fevers were common.

Causes of death.

184. The causes of death were cholera 5, fevers 4, apoplexy 1, heart disease 1, pleurisy 2, colic 1, debility 1, and unknown (out of hospital) 1.

Hoshungabad.

Latitude, 22° 45′.
Longitude, 75° 50′.
Average rainfall, 60 inches.
Rainfall in 1877, ——

185. The head-quarters and left wing of the 22nd Regiment N. I. occupied the station during the year.

Strength, sickness, and mortality.

186. The strength was 381, the hospital admissions 535, the daily sick 13·8, and the deaths 3.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	880·9	27·6	11·9
1877 ...	1404·2	36·4	7·8

187. The ratios of sickness and mortality are shown in the margin contrasted with the mean results of previous years.

Causes of death.

188. The causes of death were fever 1, bronchitis 1, and debility 1.

Kamptee.

Strength, sickness, and mortality.

189. The mean strength of the troops was 1,268, the total admissions 802, the daily sick 22·8, and deaths 11.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	823·4	28·0	10·0
1877 ...	632·5	18·0	8·7

190. The ratios of sickness and mortality were as per margin. It will be seen that there was less sickness and mortality than usual.

Composition of force.

191. The following table shows the composition of the force :—

—	Corps.								Ratio per 1,000 of Strength.							
	Native Details.		35th Regiment.		2nd Regiment L. C.		Right Wing, 22nd Regiment.		Native Details.		35th Regiment N. I.		2nd Regiment L. C.		Right Wing, 22nd Regiment.	
Number of weeks resident	52		52		52		52									
Strength	14		682		280		292									
Total admissions ...	3		415		228		156		214·3		608·5		814·3		534·2	
Daily sick	0·04		13·56		5·14		4·14		2·8		19·9		18·3		14·2	
Died in hospital ...	1		5		3		...		71·4		7·3		10·7		...	
Do. out of do. ...	...		2		...		...		...		2·9		...		...	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Small-pox	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Fevers	...	...	162	...	77	...	87	...	...	...	237·5	...	275·0	...	297·9	...
Cholera	...	...	1	...	...	...	...	...	...	...	1·4	...	...	...	...	..
Rheumatism	...	...	18	...	2	...	8	...	...	...	26·4	...	7·1	...	27·4	...
Dysentery	...	...	9	...	4	...	4	...	...	...	13·2	...	14·3	...	13·7	...
Diarrhœa	...	...	3	...	4	...	3	...	...	...	4·4	...	14·3	...	10·3	...
Hepatitis	...	...	3	...	...	...	1	...	...	...	4·4	...	...	...	3·4	...
Venereal diseases ...	1	...	4	...	2	...	1	...	71·4	...	5·8	...	7·1	...	3·4	...

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192. The causes of death were dropsy 1, aneurism 1, bronchitis 1, pneumonia 2, gangrene of lungs 1, drowning 1, paralysis 2, beri-beri 1, and debility 1.

Causes of death.

Lovedale (Ootacamund).

Strength, sickness, and mortality.

193. This place was occupied by a company of Sappers and Miners; strength 78, hospital admissions 159, daily sick 6·3; no deaths.

The admissions were numerous, but there are no figures of former years to compare with the present ratios.

Madras.

194. The strength of the Native force was 2,229, the hospital admissions 1,360, the daily sick 46·6, and deaths 37. Ten of the deaths occurred out of hospital.

Strength, sickness, and mortality.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	669·9	25·9	11·2
1877 ...	610·1	20·9	16·5

195. The ratios of sickness and mortality are shown in the margin, contrasted with the results of former years. The mortality has been higher than the average on account of cholera.

Composition of force.

196. The following table shows the composition of the force and principal diseases:—

Corps.

—	Body Guard.		37th Regiment N. I.		13th Regiment N. I.		10th Regiment N. I.		33rd Regiment N. I.		Right Wing, 38th Regt. N. I.	
Number of weeks resident ...	52		6		52		52		49		22	
Strength	116		403		619		654		609		348	
Total admissions.	110		7		574		339		223		107	
Daily sick ...	3·29		3·83		21·57		11·24		8·11		5·85	
Died in hospital ...	1		...		11		7		6		2	
Do. out of do. ...	1		1		3		5		...		...	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Small-pox ...	...	...	...	...	...	...	6	...	...	...	...	...
Fevers	39	...	2	...	191	...	98	1	66	2	25	1
Cholera	1	1	...	...	30	6	3	3	6	1	...	...
Rheumatism ...	7	...	...	...	9	...	12	...	10	...	8	...
Dysentery ...	4	...	1	...	23	...	32	...	36	1	14	...
Diarrhœa	2	...	...	...	88	...	29	...	24	...	10	...
Hepatitis	...	...	...	...	...	...	3	...	...	...	...	...
Venereal diseases.	1	...	...	...	16	...	11	...	8	...	4	...

Ratio per 1,000 of Strength.

—	Body Guard.		37th Regiment N. I.		13th Regiment N. I.		10th Regiment N. I.		33rd Regiment N. I.		Right Wing, 38th Regiment N. I.	
Number of weeks resident ...												
Strength	...		...		...		...		...		...	
Total admissions.	948·3		17·3		927·3		518·3		366·1		307·4	
Daily sick ...	28·3		9·5		34·8		17·2		13·3		16·8	
Died in hospital ...	8·6		...		17·7		10·7		9·8		5·7	
Do. out of do. ...	8·6		2·4		4·8		7·6		...		...	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Small-pox ...	...	...	...	...	...	...	9·1	...	...	...	...	...
Fevers	336·2	...	4·8	...	308·5	...	149·8	1·5	108·3	3·3	71·8	2·9
Cholera	8·6	8·6	...	...	48·4	9·6	4·6	4·6	9·8	1·6	...	...
Rheumatism ...	60·3	...	...	...	14·4	...	18·3	...	16·5	...	8·7	...
Dysentery ...	34·4	...	2·4	...	37·1	...	48·9	...	58·9	1·6	40·2	...
Diarrhœa	17·2	...	...	...	142·1	...	44·3	...	39·3	...	28·7	...
Hepatitis	...	...	...	...	...	...	4·6	...	...	...	...	...
Venereal diseases.	8·6	...	...	...	25·8	...	16·5	...	13·1	...	11·4	...

197. The causes of death were small-pox 1, fevers 4, cholera 12, phthisis 7, heart disease 1, laryngitis 1, pleurisy 1, dysentery 2, carbuncle 1, tetanus 1, debility 4, and unknown 2.

Causes of death.

Mangalore.

Latitude, 12° 52′.
Longitude, 74° 53′.
Height above sea, 40 feet.
Average rainfall, 130 inches.
Rainfall in 1877, 131 do.

198. The 34th Regiment Native Infantry occupied the station during the year.

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Strength, sickness, and mortality.

199. The strength of the regiment averaged 644, the total admissions were 234, the daily sick 11·3, and deaths 5.

200. The proportions of sickness and mortality are given in the margin. Small-pox was very prevalent amongst the civil population, and 9 cases occurred in the regiment, but none fatal. Some cases of cholera occurred amongst the civil population, but none in the regiment.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	480·8	17·5	9·2
1877 ...	363·3	17·6	7·8

Causes of death.

201. The causes of death were fevers 1, phthisis 1, pneumonia 1, hepatic disease 1, and general debility 1.

Mercara.

Latitude, 12° 25′.
Longitude, 75° 15′.
Height above sea, 4,500 feet.
Mean temperature, ——
Average rainfall, 149·4 inches.
Rainfall in 1877, 112·2 do.

202. The 28th Regiment Native Infantry occupied the station for the whole of the year.

Strength, sickness, and mortality.

203. The mean strength was 638, the total admissions 385, daily sick 13·2, and deaths 6.

204. The ratios of sickness and mortality are contrasted with the results of previous years in the margin. As a rule, newly arrived troops do not have good health at this station.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	1,073·9	41·8	13·7
1877 ...	603·5	20·7	9·4

The 28th Regiment has been years at Mercara, and in 1877 there was very little disease of a serious character.

Causes of death.

205. The causes of death were fevers 2, dysentery 2, hepatic disease 1, and colic 1.

Moulmein.

Latitude, 16° 30′.
Longitude, 97° 30′.
Mean temperature, ——
Average rainfall, ——
Rainfall in 1877, 176 inches.

Strength, sickness, and mortality.

206. The strength of the troops occupying the station was 441, the total admissions 441, the daily sick 12·8, and deaths 3.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	1,075·0	44·7	13·9
1877 ...	1,000·0	29·1	6·7

207. The ratio of sickness and mortality are shown in the margin.

Composition of force.

208. The following table shows the composition of the force :—

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—	Corps.				Ratio per 1,000 of Strength.			
	Head Quarters, Left Wing, 15th Regiment N. I.		Head Quarters, Left Wing, 4th Regiment N. I.		Head Quarters, Left Wing, 15th Regiment N. I.		Head Quarters, Left Wing, 4th Regiment N. I.	
Number of weeks resident	52		39					
Strength	180		348					
Total admissions	129		312		716·6		896·5	
Daily sick	4·36		11·28		24·2		32·4	
Died in hospital	...		2		...		5·7	
Do. out of do.	...		1		...		2·9	
	A.	D.	A.	D.	A.	D.	A.	D.
Small-pox	2	...	...	...	11·1	...	...	...
Fevers	55	...	40	...	305·5	...	114·9	...
Cholera	...	...	...	...	...	...	...	...
Rheumatism	6		13	...	33·3	...	37·3	...
Dysentery	9	...	17	...	49·9	...	48·8	...
Diarrhœa	5	...	54	1	27·7	...	155·1	2·9
Hepatitis	...	...	...	...	...	...	...	...
Venereal diseases	3	...	3	...	16·6	...	8·7	...

Causes of death.

209. The causes of death were aneurism 1, diarrhœa 1, and unknown 1.

Mysore.

Latitude, 12° 8′.
Longitude, 76° 44′.
Height above sea, 2,450 feet.
Mean temperature, ——
Average rainfall, 28 inches.
Rainfall in 1877, 31 do.

210. A detachment of the 30th Regiment from the French Rocks garrisoned the station during the year.

Strength, sickness, and mortality.

211. The strength was 65, the hospital admissions 56, and daily sick 1. One man died of peritonitis.

Nicobars.

Strength, sickness, and mortality.

212. A detachment of the 15th Regiment Native Infantry occupied the station. The strength was 59, the hospital admissions 387, and daily sick 5·4.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
8 years ...	6340·5	191·5	21·1
1877 ...	6559·3	92·8	...

213. The ratios of sickness are contrasted with results of eight previous years in the margin. The large proportion of sick is due to malarious fevers. Every man sent on duty to the islands gets fever and is repeatedly in hospital. Evidently more clearing and sanitary work is required to make a healthy settlement in the Nicobars.

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Palamcottah.

Latitude, 8° 45′.
Longitude, 77° 48′.
Height above sea, 120 feet.
Average rainfall, 20 inches.
Rainfall in 1877, 60 do.

Strength, sickness, and mortality.

214. The strength of the force was 694, the hospital admissions 261, the average daily sick 9·3, and deaths 3.

215. The proportion of sickness and mortality are given in the margin. It will be seen that the results of the year are very favourable when compared with the means of eleven previous years. The rainfall at the close of the year was excessive.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	507·0	18·6	8·6
1877 ...	376·0	13·4	4·2

Composition of force.

216. The following table shows the particulars of the troops :—

—	Corps.				Ratio per 1,000 of Strength.			
	24th Regiment N. I.		37th Regiment Grenadiers.		24th Regiment N. I.		37th Regiment Grenadiers.	
Number of weeks resident ...	9		52					
Strength	617		587					
Total admissions	35		226		56·7		385·0	
Daily sick	6·34		8·20		10·3		13·9	
Died in hospital	...		2		...		3·4	
Do. out of do.	...		1		...		1·7	
	A.	D.	A.	D.	A.	D.	A.	D.
Small-pox	...	...	...	...	...	...	..	...
Fevers	19	...	71	...	30·8	...	120·9	...
Cholera	1	...	2	1	1·6	...	3·4	1·7
Rheumatism	1	...	10	...	1·6	...	17·1	...
Dysentery	...	...	8	...	...	...	13·7	...
Diarrhœa	1	...	4	...	1·6	...	6·8	...
Hepatitis	...	...	...	...	...	...	...	...
Venereal diseases	7	...	12	...	11·3	...	20·5	...

Causes of death.

217. The causes of death were fever 1, cholera 1, and phthisis 1.

Palaveram.

218. The strength of the troops, including the Native Infantry Depôt, was 486, the total hospital admissions 435, average daily sick 26·4, and deaths 10.

Strength, sickness, and mortality.

219. The ratios of sickness and mortality are given in the margin. Since there has been a regiment at Palaveram as well as the invalids from foreign service, the total proportion of sickness and mortality is much reduced.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	1444·3	120·2	40·4
1877 ...	895·0	54·4	20·5

Palaveram is perhaps one of the healthiest stations in the Presidency, though owing to the inclusion of the sick of the Native Infantry Depôt in the stational returns, the fact is not brought out.

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Composition of force.

220. The following table shows the composition of the force:—

—	Corps.				Ratio per 1,000 of Strength.			
	Native Infantry Depôt.		Right Wing 39th Regiment N. I.		Native Infantry Depôt.		Right Wing 39th Regiment N. I.	
Number of weeks resident	52		52					
Strength	85		401					
Total admissions	193		242		2270·6		603·4	
Daily sick	17·99		8·45		211·6		21·1	
Died in hospital	6		4		70·6		9·9	
Do. out of do.	...		...		...		...	
	A.	D.	A.	D.	A.	D.	A.	D.
Small-pox	1	...	2	...	11·7	...	4·9	...
Fevers	18	...	32	...	211·8	...	79·8	...
Cholera	...	...	...	...	...	...	...	...
Rheumatism	19	...	19	...	223·5	...	47·3	...
Dysentery	7	...	20	...	82·3	...	49·8	...
Diarrhœa	17	1	6	...	200·0	11·7	14·8	...
Hepatitis	1	...	1	...	11·7	...	2·5	...
Venereal diseases	5	...	15	...	58·8	...	37·4	...

There were 6 deaths in the Native Infantry Depôt and 4 in the regiment.

Causes of death.

221. The causes of death were phthisis 1, heart disease 1, diarrhœa 1, dyspepsia 1, paralysis 1, and debility 5.

Port Blair.

222. The two islands of the Andamans, "Ross" and "Viper" Island, were garrisoned by detachment of the 15th Regiment Native Infantry.

Strength, sickness, and mortality.

223. The strength of the troops was 405, the total hospital admissions 785, the daily sick 19·22, and deaths 5.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	1456·9	52·7	12·1
1877 ...	1938·2	47·4	12·3

224. The ratios of sickness and mortality are contrasted here with the results of previous years. Slight fevers are common in the Andamans, and during the last year have prevailed more than customary.

Causes of death.

225. The causes of death were fever 1, phthisis 1, ascites 1, gastro-enteritis 1, and nephritis 1.

Quilon.

Latitude, 8° 53′.
Longitude, 76° 33′.
Average rainfall, 91 inches.
Rainfall in 1877, 121 do.

226. The station was occupied for the year by the 26th Regiment Native Infantry.

Strength, sickness, and mortality.

227. The mean strength of the troops was 425, total admissions 151, average daily sick 10·71, and deaths 7. Four deaths occurred out of hospital.

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228. The ratios of sickness and mortality are given in the margin. The death-rate of 1877 has been in excess of the average. Cholera prevailed in the station, and there were 3 cases and one death in the regiment.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	495·5	21·8	7·8
1877 ...	355·2	25·2	16·4

Causes of death.

229. The causes of death were cholera 1, phthisis 1, anæmia 1, pleurisy 2, abscess 1, and debility 1.

Raepore.

Latitude, 26° 10′.
Longitude, 71° 0′.
Average rainfall, 45·00 inches.
Rainfall in 1877, 40· do.

230. The station was occupied for the whole year by the 31st Regiment Native Infantry.

Strength, sickness, and mortality.

231. The strength of the troops was 641, the total hospital admissions 319, the daily sick 14·1, and deaths 5.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	999·3	32·9	12·5
1877 ...	497·6	22·0	7·7

232. The ratios of sickness and mortality are shown in the margin. Cholera prevailed in the Native town and spread to the cantonment.

Causes of death.

233. The causes of death were cholera 1, phthisis 3, and heart disease 1.

Rangoon.

Strength, sickness, and mortality.

234. The strength of the Native troops, including garrison details of the Military Depôt, was 1,734, the hospital admissions 1,538, the daily sick 551·86, and deaths 19.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	592·3	29·4	10·5
1877 ...	886·9	32·2	10·9

235. The proportions of sickness and mortality are given in the margin. The admissions have been above the average.

Composition of force.

236. The following table shows the composition of the force:—

—	Corps.										Ratio per 1,000 of Strength.									
	Garrison Details.		Hd. Quarters, Left Wing, 4th Regiment N. I.		D Company, Sappers and Miners.		Left Wing, 39th Regiment.		24th Regiment N. I.		Garrison Details.		Hd. Quarters, Left Wing, 4th Regiment N. I.		D Company, Sappers and Miners.		Left Wing, 39th Regiment N. I.		24th Regiment N. I.	
Number of weeks resident ...	52		13		52		8		40											
Strength	954		493		122		261		643											
Total admissions ...	359		108		157		32		882		376·3		219·1		1286·9		122·6		1373·2	
Daily sick ...	17·21		17·71		4·90		7·00		36·46		18·0		35·9		40·2		26·8		56·7	
Died in hospital ...	13		2		1		...		3		13·6		4·1		8·2		...		4·6	
Do. out of do. ...	...		...		...		...		...		...		...		...		...		...	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Small-pox ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Fevers	66	1	27	...	38	1	4	...	211	1	69·2	1·0	54·7	...	311·4	8·2	15·3	...	328·1	1·5
Cholera	1	1	...	...	...	...	...	...	1	1	1·0	1·0	...	...	...	...	...	...	1·5	1·5
Rheumatism ...	23	1	11	...	10	...	5	...	43	...	24·1	1·0	22·3	...	81·9	...	...	...	66·8	...
Dysentery ...	33	...	4	...	22	...	3	...	137	...	34·6	...	8·1	...	180·3	...	19·1	...	213·1	...
Diarrhœa ...	30	1	7	...	17	...	...	...	35	...	31·4	1·0	14·2	...	139·4	...	11·4	...	54·4	...
Hepatitis ...	2	...	...	...	...	...	...	...	...	...	2·1	...	...	...	...	...	...	...	...	...
Venereal diseases ...	11	...	...	...	12	...	1	...	96	...	11·5	...	...	...	98·4	...	3·8	...	149·3	...

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237. The causes of death were ague 1, fever 3, cholera 2, rheumatism 2, anæmia 1, ascites 1, heart disease 2, bronchitis 1, diarrhœa 1, dyspepsia 1, beri-beri 1, debility 2, and peritonitis 1.

Causes of death.

Secunderabad.

238. The strength of the Native troops was 3,203, the total hospital admissions 2,793, the average daily sick 86·9, and deaths 46. Of the deaths 4 occurred out of hospital.

Strength, sickness, and mortality.

239. The ratios of sickness and mortality are compared in the margin with the results of previous years. The year was an unhealthy one, and cholera prevailed in the bazaars for many months. Intermittent fevers also were common at the end of the year.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	915·7	34·8	10·7
1877 ...	871·9	27·1	14·3

240. The following table shows the composition of the force :—

Composition of force.

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	Corps.														Ratio per 1,000 of Strength.													
	Garrison.		G. H. K. Company, Sappers and Miners.		3rd Regiment Light Infantry.		H. M.'s 29th Regiment Native Infantry.		H. M.'s 40th Regiment Native Infantry.		1st Regiment Light Cavalry.		1st Regiment Native Infantry.		Garrison.		G. H. K. Company, Sappers and Miners.		3rd Regiment Light Infantry.		H. M.'s 29th Regiment Native Infantry.		H. M.'s 40th Regiment Native Infantry.		1st Regiment Light Cavalry.		1st Regiment Native Infantry.	
Number of weeks resident	52		52		52		52		52		52		52															
Strength	11		216		694		666		676		288		652															
Total admissions...	4		236		643		724		315		234		637		363 6		1092·6		926·5		1087·1		465·1		812·5		976·9	
Daily sick ...	0·19		7·84		20·64		22·62		16·16		5·06		14·40		17·3		36·3		29·7		33·9		23·9		17·5		22·1	
Died in hospital ...	1		1		6		9		10		3		12		90·9		4·6		8·6		13·5		14·8		10·4		18·4	
Do. out of do. ...	1		...		...		...		...		...		3		90·9		...		...		...		...		...		4·6	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Small-pox ...	...	...	...	...	...	...	...	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	1·5	...	3·5	...	...	...
Fevers	...	...	132	...	303	1	555	4	97	...	104	1	432	2	...	...	611·1	...	451·0	1·4	833·3	6·0	143.5	...	361·1	3·5	662·5	3·1
Cholera	...	...	...	...	5	3	1	1	2	2	...	...	3	1	...	...	...	...	7·2	4·3	1·5	1·5	2·9	2·9	...	...	4·6	1·5
Rheumatism ...	1	...	12	...	24	...	17	...	17	...	7	...	13	...	90·9	...	55·5	...	34·5	...	25·5	...	25·1	...	24·3	...	19·9	...
Dysentery ...	...	...	8	...	12	...	16	...	22	...	5	...	18	...	...	...	37·0	...	17·2	...	24·0	...	32·5	...	17·3	...	27·6	...
Diarrhœa ...	...	...	8	...	7	...	11	2	13	3	3	...	17	2	...	..	37·0	...	10·1	...	16·5	3·0	19·2	4·4	10·4	...	26·1	3·1
Hepatitis ...	...	...	...	...	2	...	...	...	...	...	...	...	1	1	...	...	...	...	2·9	...	...	...	...	...	...	...	1·5	1·5
Venereal diseases ...	...	...	5	...	21	...	3	...	11	...	3	...	19	1	...	...	23·1	...	30·2	...	4·5	...	16·3	...	10·4	...	29·1	1·5

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241. The causes of death were fevers 9, cholera 7, phthisis 1, anæmia 3, dropsy 3, heart disease 1, pneumonia 2, bronchitis 1, diarrhœa 7, hepatitis 1, jaundice 1, secondary syphilis 1, intoxication 1, congestion of the brain 1, melancholia 1, orchitis 1, paralysis 2, debility 2, and stomatitis 1.

Causes of death.

Seetabuldee.

242. This station was occupied by the head-quarters of 8th Regiment Native Infantry for the whole year.

Strength, sickness, and mortality.

243. The strength was 429, the total hospital admissions 900, the daily sick 16·6, and deaths 4; one out of hospital.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	1388·8	39·8	6·9
1877 ...	2097·9	38·8	9·2

244. The proportions of sickness and mortality are given in the margin. Malarious fevers prevailed to a great extent, and the sick and death-rates were in excess of the average.

Causes of death.

245. The causes of death were dropsy 2, apoplexy 1, and pneumonia 1.

Seroncha.

Latitude, 18° 50′.
Longitude, 80° 2′.
Average rainfall, 42·9 inches.
Rainfall in 1877, 39·6 do.

246. The station was occupied by a detachment of the 8th Regiment Native Infantry.

Strength, sickness, and mortality.

247. The strength was 174, the hospital admissions 166, the daily sick 9·2, and death 1.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	1471·9	45·2	9·6
1877 ...	954·0	53·3	5·7

248. The proportions of sickness and mortality are given in the margin. Epidemic cholera was prevalent in the station, but did not affect the troops.

Cause of death.

249. The death was due to hepatitis,

Shoaygheen,

Latitude, 18° 0′.
Longitude, 96° 45′.
Mean temperature, ——
Average rainfall, 157 inches.
Rainfall in 1877, 157 do.

250. A detachment of the 17th Regiment Native Infantry occupied the station during the year.

Strength, sickness, and mortality.

251. The strength of the detachment was 120, the total hospital admissions 233, the daily sick 6·7; no deaths occurred.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	1999·8	71·0	12·9
1877 ...	1941·6	55·8	...

252. The proportions of sickness and mortality are shown in the margin compared with the average of previous eleven years. Malarious fevers were prevalent at the station as is always the case.

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Saint Thomas' Mount.

253. The station was occupied by a detachment of the 14th (one week) and 39th Regiment Native Infantry (51 weeks).

Strength, sickness, and mortality.

254. The strength of the troops was 168, the hospital admissions 67, the daily sick 14·1; no deaths.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	564·4	14·9	8·7
1877 ...	398·8	84·0	...

255. The ratios of sickness and mortality of the Native troops at this station are shown in the margin.

Sumbulpore.

Latitude, 21° 21′.
Longitude, 83° 45′.
Mean temperature, ——
Average rainfall, 66·1 inches.
Rainfall in 1877, 67·6 do.

256. The station was occupied for the whole year by the Left Wing, 2nd Regiment Native Infantry.

Strength, sickness, and mortality.

257. The strength of the troops was 304, the total hospital admissions 211, the daily sick 4·2, and deaths 3.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	1250·5	37·1	20·7
1877 ...	694·1	14·1	9·7

258. The ratios of sickness and mortality are shown in the margin. Measles and ophthalmia were prevalent, and cholera amongst the civil population. The chief causes of admissions were intermittent fevers.

Causes of death.

259. The causes of death were fever 1, apoplexy 1, and unknown (sudden death out of hospital) 1.

Thayetmyo.

260. The 6th Regiment Native Infantry remained the whole year at the station.

Strength, sickness, and mortality.

261. The strength of the troops was 598, the total admissions 538, the daily sick 24·3, and deaths 8.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	574·2	24·5	9·2
1877 ...	887·9	40·7	13·4

262. The ratios of sickness and mortality are given in the margin. The cholera epidemic which affected the European troops and civil population did not touch the Native troops, and the same thing has been noticed in former epidemics. The fact is the Native lines at Thayetmyo occupy by far the best site and lie away from the river bank, the river being the great highway of traffic at all periods of the year.

Causes of death.

263. The causes of death were fever 1, dropsy 1, apoplexy 1, pneumonia 2, dysentery 1, hepatitis 1, and debility 1.

Tonghoo.

Strength, sickness, and mortality.

264. The strength of the troops was 704, the hospital admissions 622, the daily sick 20·1, and deaths 11. Eight deaths occurred out of hospital.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	977·2	45·8	15·8
1877 ...	883·5	28·5	15·6

265. The ratios of sickness and mortality are given in the margin. Cholera was epidemic in the neighbourhood, but only one sepoy was attacked.

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Composition of force.

266. The following table shows the composition of the force:—

—	Corps.						Ratio per 1,000 of Strength.					
	17th Regiment N. I.		Left Wing, 39th Regiment N. I.		Right Wing, 4th Regiment N. I.		17th Regiment N. I.		Left Wing, 39th Regiment N. I.		Right Wing, 4th Regiment N. I.	
Number of weeks resident ...	52		4		44							
Strength	446		261		281							
Total admissions	380		4		232		865·4		15·3		825·6	
Daily sick	14·93		7·13		7·96		33·4		27·3		28·3	
Died in hospital	...		...		3		...		...		10·7	
Do. out of do.	7		...		1		15·7		...		3·5	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Small-pox	...	...	...	...	1	...	...	...	...	...	3·5	..
Fevers	122	...	2	...	47	1	273·5	...	7·6	...	167·2	3·5
Cholera	...	...	...	...	...	...	...	...	...	...	...	...
Rheumatism	24	...	...	...	9	...	53·8	...	...	...	32·0	...
Dysentery	60	...	...	...	43	...	134·5	...	...	...	153·0	...
Diarrhœa	32	...	...	...	12	...	71·7	...	...	...	42·7	...
Hepatitis	...	...	...	...	...	...	...	...	...	...	...	..
Venereal diseases	6	...	...	...	4	...	13·4	...	...	...	14·2	...

Causes of death.

267. The causes of death were fevers 1, ascites 1, diarrhœa 1, debility 3, and unknown 5.

Trichinopoly.

Strength, sickness, and mortality.

268. The strength of the troops was 1,879, the total hospital admissions 1,288, the daily sick 47·8, and deaths 28.

269. The ratios of sickness and mortality are given in the margin. Cholera, small-pox and famine diseases were very prevalent amongst the civil population, and the native troops did not escape the cholera epidemic. Hence the sickness and mortality has been in excess of the average rates of the station.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	608·0	18·5	10·9
1877 ...	685·9	25·4	14·8

Composition of force.

270. The following table shows the composition of the force:—

—	Corps.								Ratio per 1,000 of Strength.							
	Garrison.		8th Regiment N. I.		19th Regiment N. I.		32nd Regiment N. I.		Garrison.		38th Regiment N. I.		19th Regiment N. I.		32nd Regiment N. I.	
Number of weeks resident ...	52		52		52		52									
Strength	91		527		633		628									
Total admissions	18		303		410		557		197·8		574·9		647·7		886·9	
Daily sick	1·63		12·09		17·35		16·75		·17·9		22·9		27·4		26·6	
Died in hospital	2		8		9		8		21·9		15·1		14·2		12·7	
Do. out of do.	...		...		...		1		...		...		...		1·6	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Small-pox	...	...	5	...	1	...	3	...	...	...	9·5	...	1·6	...	4·7	...
Fevers	1	...	98	1	186	1	156	...	11·0	..	185·9	1·9	293·8	1·6	248·4	...
Cholera	...	...	7	1	8	5	17	5	...	...	13·3	1·9	12·6	7·9	27·1	7·9
Rheumatism	...	...	15	...	17	...	15	...	...	...	28·4	...	26·5	...	23·5	...
Dysentery	...	...	17	...	30	...	63	2	...	...	32·2	...	47·4	...	100·3	3·2
Diarrhœa	1	...	14	...	12	...	38	...	11·0	...	26·5	...	18·9	...	60·5	...
Hepatitis	...	...	4	1	1	...	...	...	...	...	7·6	1·9	1·6	...	...	...
Venereal diseases	...	...	14	...	6	...	10	...	...	...	26·5	...	9·5	...	15·9	...

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271. The causes of death were cholera 11, fevers 2, phthisis 1, anæmia 1, dropsy 1, pneumonia 1, dysentery 2, hepatitis 1, opium poisoning 1, obstruction of bowels 1, paralysis 1, debility 3, hæmorrhage 1, and unknown 1.

Causes of death.

Trichoor.

Latitude, 10° 32′.
Longitude, 76° 17′.

272. This station was occupied by a detachment of the 26th Native Infantry.

Strength, sickness, and mortality.

273. The strength of the troops was 159, the total admissions 115, the daily sick 3·5, and deaths 3.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	420·2	17·7	5·2
1877 ...	723·2	22·4	18·8

274. The ratios of sickness and mortality are compared with the mean results of eleven years in the margin. The ratios are much higher than the average, but there was no epidemic disease.

Causes of death.

275. The causes of death were diarrhœa 2 and aneurism of aorta 1.

Trevandrum.

276. The station was occupied by a company of the 26th Regiment Native Infantry.

Strength, sickness, and mortality.

277. The strength was 74, and the hospital admissions 55; daily sick 1·3. No deaths occurred.

Vellore.

Latitude, 21° 56′.
Longitude, 79° 14′.
Average rainfall, 36·4 inches.
Rainfall in 1877, 43·2 do.

278. The 14th Regiment Native Infantry occupied the station during the year.

Strength, sickness, and mortality.

279. The strength of the troops was 649, the total admissions 343, the daily sick 10·7, and deaths 32. Three deaths occurred out of hospital.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	598·0	26·5	18·6
1877 ...	528·5	16·5	49·2

280. The ratios of sickness and mortality are given in the margin. The heavy death-rate in 1877 was due chiefly to epidemic cholera, of which there were 38 cases and 17 deaths amongst the troops. The disease prevailed twice during the year in an epidemic form. It was common in the town and neighbourhood, and a large public work employing some thousands of famine-stricken people was carried on quite close by the lines of the regiment, *i.e.*, the emptying of the Sooria Gunta of accumulated deposits of silt, the earth being spread out near the lines. Besides the ordinary garrison duty the regiment had to furnish guards for the Central Jail, and the men and families suffered much from scarcity and high prices.

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281. The following table shows the principal diseases :—

—	Corps.		Ratio per 1,000 of Strength.	
	14th Regiment, Native Infantry.		14th Regiment Native Infantry.	
Number of weeks resident ...	52			
Strength	649			
Total admissions	343		528·5	
Daily sick	10·71		16·5	
Died in hospital	29		44·6	
Do. out of do.	3		4·6	
	A.	D.	A.	D.
Small-pox	14	...	21·5	...
Fevers	50	...	77·1	...
Cholera	38	17	58·5	26·1
Rheumatism	11	...	16·9	...
Dysentery	13	3	20·03	4·6
Diarrhœa	20	2	30·8	3·08
Hepatitis	1	...	1·5	...
Venereal diseases	14	...	21·5	...

Causes of death.

282. The causes of death were cholera 17, phthisis 1, dropsy 2, bronchitis 1, dysentery 3, diarrhœa 2, poisoning 1, suicide 2, debility 2, and heart-disease 1.

Vizagapatam.

Strength, sickness, and mortality.

283. The strength of the troops was 597, the hospital admissions 309, the average daily sick 20·6, and deaths 4.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	727·9	40·9	12·1
1877 ...	517·5	34·6	6·7

284. The proportions of sickness and mortality are shown in the margin. Cholera prevailed in the town and district at the end of the year.

Composition of force.

285. The following table shows the composition of the force :—

—	Corps.				Ratio per 1,000 of Strength.			
	Garrison.		H. M.'s 7th Regiment N.I.		Garrison.		H. M.'s 7th Regiment N.I.	
Number of weeks resident ...	52		52					
Strength	75		522					
Total admissions	19		290		253·3		555·5	
Daily sick	3·70		16·96		49·3		32·5	
Died in hospital	1		3		13·3		5·7	
Do. out of do.	...		...		...		...	
	A.	D.	A.	D.	A.	D.	A.	D.
Small-pox	...	...	...	...	...	...	...	...
Fevers	2	...	64	...	26·6	...	122·6	...
Cholera	1	1	2	...	13·3	13·3	3·8	...
Rheumatism	5	...	33	...	66·6	...	63·2	...
Dysentery	...	...	10	...	...	...	19·1	...
Diarrhœa	...	...	6	...	...	...	11·5	...
Hepatitis	...	...	1	...	...	...	1·9	...
Venereal diseases	...	...	9	...	...	...	17·3	...

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Causes of death.

286. The causes of death were cholera 1, phthisis 1, apoplexy 1, and pneumonia 1.

Vizianagaram.

Latitude, 18° 21′.
Longitude, 83° 32′.
Average rainfall, 45 inches.
Rainfall in 1877, 40 do.

287. The 41st Regiment Native Infantry occupied the station for the whole year.

Strength, sickness, and mortality.

288. The strength of the troops was 637, the total admissions 1,099, the daily sick 46·8, and deaths 10; one death occurred out of hospital.

Comparison with former years.

	Admissions.	Daily Sick.	Deaths.
11 years ...	592·5	28·2	10·8
1877 ...	1725·2	73·5	15·6

289. The proportions of sickness and mortality are shown in the margin. The sickness has been very high, chiefly from fevers and debility occasioned by scarcity and high prices of food. Cholera appeared in February and 5 deaths occurred. General distress and famine imminent at the close of the year.

Causes of death.

290. The causes of death were cholera 5, fevers 2, poisoning by Indian hemp 1, erysepilas 1, and apoplexy 1.

Cocanada.
Ellore.
Eskapally.
Jaggiahpett.
Kurnool.
Nellore (East Coast Canal).
Ootramalloor.
Rajahmundry.

291. Besides the regular army stations already noted, in 1877 it was necessary, on account of the famine distress, to post detachments of various corps, and especially of Sappers in various places where public relief works were in progress. In this way the stations marginally named were temporarily occupied by Native troops for some period of the year.

The average strength of the troops so occupied was 891, the hospital admissions 717, and deaths 6.

SECTION IV.

JAILS.

Influence of the famine on Jail statistics.

292. Whenever a period of sore distress occurs amongst a native population, the jail statistics of the province show a higher ratio of crime, and the people come into jail broken down in health, and liable to great mortality. During the past year many thousands of persons in Southern India have committed offences with the sole object of finding refuge and food in the State gaols. The gaols, in fact, of the chief famine districts have been very little more than "relief-houses," better disciplined, and better managed than the homes or "camps" provided for the starving poor who had patiently refrained from breaches of the law. In all our experience of jail management in Madras, we have never experienced anything like the influx of prisoners, nor have they ever before been so generally enfeebled by long privation as in the memorable year 1877.

Jail population.

293. The number of prisoners remaining in all the jails on the 31st of December 1876 was 14,242. The jail population had begun to increase in fact from September 1876. On the 1st January 1877 selected prisoners to the number of 2,274 were liberated to mark the occasion of

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Her Majesty the Queen's assumption of the title of "Empress of India." This made a temporary clearing of overcrowded jails; but by the end of the month the district jails were as full as ever.

294. The total number brought into the jails in 1877 was 70,779, and the total strength to be accounted for, including the remaining on 31st December 1877, was 85,021.

They were thus disposed of:—

Liberated ...	43,663
Transferred ...	12,979
Transported beyond seas ...	593
Escaped ...	26
Died { In hospital ...	3,580
Died { Out of do. ...	16
Executed ...	83
Remaining in Jails on 31st December 1877 ...	24,081
Total ...	85,021

The numbers received into jail were about four times in excess of the average in ordinary seasons, and the daily strength throughout the year was more than double the average. It will thus be evident that the Jail Department had to resort very extensively to temporary accommodation, and that it had an excessive amount of labor and responsibility thrown upon it by the famine. The temporary buildings put up were usually the results of jail labor, and for the most part they answered the purpose of their construction very well.

Strength, sickness, and mortality according to Medical Returns.

295. According to the medical returns the average strength of the prisoners for the whole year was 20,403. In January the strength was only 13,063; but the numbers rose gradually all through the worst months of the famine until October, when the strength reached 26,695. From this time the numbers began to diminish, and in December the strength was reduced to 24,572.

296. The total hospital admissions were 19,819, deaths in hospital 3,580, and average daily sick 833·7.

Sickness and mortality compared with former years.

297. The main sanitary facts in connection with the jails in the past year have been the great increase in numbers, and the enormous mortality due to the miserable condition of the people on admission. The proportions of sickness and mortality for a series of years are shown below:—

Years.	Ratio of Admissions.	Ratio of Deaths.
1861-62 ...	1502·6	93·0
1862-63 ...	1319·0	89·4
1863-64 ...	1373·6	107·6
1864-65 ...	1491·1	101·5
1865 ...	1290·6	126·3
1866 ...	1249·7	124·5
1867 ...	1012·4	53·9
1868 ...	869·1	33·8
1869 ...	804·7	41·8
1870 ...	735·2	26·5
1871 ...	779·9	17·9
1872 ...	681·1	22·2
1873 ...	599·8	28·3
1874 ...	714·1	26·6
1875 ...	752·6	38·7
1876 ...	703·6	42·4
1877 ...	971·3	175·4

Sickness and mortality of Jails in distressed Districts compared with the other Jails.

298. But to show how the jail mortality has accurately indexed the condition of people in the actual famine districts and in those districts in which the people have merely suffered from general scarcity and dearness of food, I have constructed a table to compare the mortality of jails in the famine area, with the same data for the remaining districts. In the famine area the mortality was at the rate of 215·7 per mille; in the other parts of the Presidency only 68·3 per mille.

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Table showing Sickness and Mortality among the Jail Population in the distressed Districts of the Madras Presidency compared with results of non-Famine Districts during the year 1877.

Jails.	Average Strength.	Total Admissions.	Average Daily Sick.	Deaths.	Ratio per 1,000 of Strength. Admissions.	Ratio per 1,000 of Strength. Average Daily Sick.	Ratio per 1,000 of Strength. Deaths.
Jails in Famine Area.							
Bellary	1,771	1,730	90·42	565	976·8	51·0	319·0
Chingleput	400	647	25·21	56	1617·5	63·0	140·0
Chittoor	753	1,708	56·71	404	2268·2	75·3	536·5
Coimbatore Central	1,237	744	47·04	145	601·4	38·0	117·2
Do. District	741	1,556	70·13	487	2099·8	94·6	657·2
Cuddapah	568	486	16·30	68	855·6	28·7	119·7
Guindy	67	44	1·35	3	656·7	20·1	44·7
Kurnool District and Camp ...	925	1,254	36·03	284	1355·6	38·9	307·0
Madura	1,140	1,521	54·49	342	1334·2	47·7	300·0
Nellore	1,345	1,702	59·70	263	1265·4	44·3	195·5
Penitentiary, Madras	660	433	15·65	18	656·0	23·7	27·2
Salem	1,768	1,338	70·86	298	1756·7	40·0	168·5
Vellore Central and Camp ...	1,408	769	26·26	31	546·1	18·6	22·0
Cuddalore	852	635	15·32	65	745·3	17·9	76·2
Trichinopoly District and Camp.	660	276	14·20	76	418·1	21·5	115·1
Palghaut Fort	405	629	24·36	67	1553·0	60·1	165·4
Total ...	14,700	15,472	624·03	3,172	1052·5	42·4	215·7
All other Jails.							
Berhampore	277	151	6·69	22	545·1	24·1	79·4
Cannanore Central	805	775	51·17	89	962·7	63·5	110·5
Calicut	241	170	9·24	53	705·3	38·3	219·9
Guntoor	395	97	4·44	3	245·5	11·2	7·5
H. M.'s Jail, Madras (*Civ. Debtors*)	17	40	1·34	...	2352·9	78·8	...
Mangalore	141	216	8·33	9	1531·9	59·4	63·8
Masulipatam	131	58	2·52	1	442·7	19·2	7·6
Ootacamund European ...	24	33	0·91	1	1375·0	37·9	41·6
Do. Native	157	173	7·89	9	1101·8	50·2	57·3
Palamcottah	449	206	4·97	12	458·7	11·0	26·7
Rajahmundry Central	1,036	1,106	71·50	24	1067·5	69·0	23·1
Do. District	191	215	10·64	5	1125·6	55·7	26·1
Russelcondah	136	191	3·72	4	1404·4	27·3	29·4
Tanjore	215	126	6·07	32	586·2	28·2	148·8
Tellicherry	112	73	2·92	8	651·7	25·9	71·3
Tranquebar	158	110	3·39	9	696·2	21·4	56·9
Trichinopoly Central	1,098	300	12·28	59	273·2	11·1	53·7
Vizagapatam	389	307	7·67	68	789·2	19·7	174·8
Total ...	5,972	4,347	215·74	408	727·8	36·0	68·3

299. In the famine area there are two jails in which there was no undue mortality, viz., the Madras Penitentiary and the Vellore Central Jail. In both of these jails the mortality contrasted very favourably with that of the outside population. In Madras the prisoners are mostly thieves of the habitual class on short sentence, and persons of this class do not starve if they can help it. The Central Jail of Vellore does not receive prisoners immediately from the district of North Arcot, except as transfers from the District Jail at Chittoor; and consequently the persons in that jail, even if they had been half-starved before incarceration, had recovered previously to transfer, and were kept in good health by the jail diet. But the Superintendent notices that many were received in the Chittoor (North Arcot) Jail terribly emaciated, requiring the greatest care, and that he anticipates a high death-rate amongst that class in the present year. In the Chittoor Jail, which is the District Jail of North Arcot, the ratio of mortality was 536·5 per mille; in the Coimbatore District Jail 657·2 per mille; in the Kurnool Jail 307·0 per mille; in Madura 300 per mille; and in Bellary 319·0.

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300. The Central Jails from the fact of their receiving only long-sentenced prisoners, have not shown the famine influences nearly so much as the District Jails; but in most of these the mortality has been much higher than the average and no doubt due to the same causes, the reception of prisoners in enfeebled health. The following table contrasts the sickness and mortality in the two classes of jails:—

Sickness and mortality in Central Jails compared with District Jails.

Sickness and Mortality of Central compared with District Jails, 1877.

Jails.	Strength.	Ratio of Sickness and Mortality.		
		Admissions.	Daily Sick.	Deaths.
Central Jails	7,352	684·4	37·9	87·8
District do.	13,320	1110·1	42·0	220·2

Properly the Salem Jail, which is both District and Central, ought not to have been included in the Central Jails, as its chief unhealthiness during last year has been due to the number and bad health of the district prisoners. If Salem Jail be considered a District Jail for this year, the ratios will show still more more favorable conditions of Central Jail life in a time of famine.

301. The diseases of the prisoners have been of the same nature as those of the civil population—small-pox and eruptive fevers, cholera and malarious fevers. The ratio of cholera mortality though very high, has not been in excess of the ratio of exceptionally unhealthy years before. Cholera prevailed at different seasons in different parts of the country. In the Coimbatore Central Jail an outbreak occurred in July, which was checked by encamping the prisoners. In Chittoor cholera clung to the jail throughout the year, and I cannot help thinking that the causes were connected with the jail itself. I recommended its vacation last March if cholera continued, but it was impracticable to encamp the large number of prisoners. This jail should be abandoned so soon as means are available for building a new one. The buildings are old and tainted, and incapable of improvement. In Madura, I believe cholera was perpetuated by a custom of locking up, day and night, new arrivals in some, so-called, "quarantine" huts, defective in ventilation and tainted with cholera discharges. On my inspection in December I advocated a discontinuance of the practice, and cholera declined. In all the jails where cholera prevailed there was overcrowding, and the disease was everywhere rife amongst the civil population.

Principal Diseases—Remarks on.

Cholera.

302. The immediate removal of persons from a locality where cholera declares itself is advocated for jails as well as barracks, and the regulations on the subject are clear enough, but in the last year it was quite impracticable to extemporise accommodation and supervision for camp jails to meet the necessities of each outbreak. It often happened, as at Nellore, that instead of an average strength of 200 there were 2,000 prisoners actually in jail, and with the extra duties of the police, it would have been impossible to guard the whole of the prisoners moved out into camp. Removal from infected buildings in the case of the Coimbatore Central Jail seemed to be effectual, and I believe the same result would have followed at Chittoor if the prisoners could have been taken elsewhere.

303. But though cholera was so prevalent and fatal in our jails as to destroy twenty-five per mille of the strength of prisoners, epidemic pestilences were nothing like so formidable and fatal as that very deadly disease "chronic starvation." When the food-supplies of a people are insufficient to sustain life, and all the tissues of body have wasted, the mortality occurs mainly as a result of the feeble powers of assimilating food. After the victims of chronic starvation get into jail there is no lack of suitable and nourishing food, and if the issue of nutriment to persons in an advanced stage of chronic starvation can save life, there should be no famine mortality in jails.

Deaths from Starvation, Diarrhœa, Dysentery, and Dropsies.

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But experience—whether in jails or famine-relief camps—tells precisely the same story, viz., that there is a stage in the downward progress of those whose food has been habitually insufficient, from which recovery is impossible. When the powers of digestion and assimilation are impaired, diarrhœa, dysentery, and dropsies set in, the symptoms of which are unrelievable by food or medicine, and death follows. The diseases resulting directly from privation have killed in jails more than three times the number that were cut off by cholera or other epidemic pestilence.

Deaths from Ulcers attributable to Famine.

304. Besides the large number of deaths recorded from dysentery, diarrhœa and dropsy (1,798), the famine is indirectly accountable for a much greater mortality. Thus, in bodies much debilitated by starvation, it was a common observation that the slightest scratch of skin would often run into an intractable sore, and when the emaciated legs of the criminals were encompassed by iron fetters, some friction and breach of skin was certain to result. These sore legs ulcerated, and the ulcers not unfrequently became tainted with the hospital air, and went on to sloughing and gangrene: 153 deaths were recorded as due to ulcers and sores.

Pneumonia.

305. Pneumonia, or an inflammatory affection of the lungs, very rapid and fatal in its course, prevailed almost as an epidemic in Bellary, Coimbatore, Chittoor, Cuddapah, Nellore, and Salem Jails in the cold season.

Deaths from Ulcerative Aphthous affection of mouth and gullet.

306. In the Coimbatore Jail, in which the condition of the newly arrived prisoners was most pitiable to behold, a curious ulcerative, aphthous affection of the mouth and gullet was noticed, and 51 deaths are recorded as due to it. A similar disease appeared in the Madras relief-camps in which the tongue and lining membrane of the mouth was often seen entirely denuded of epithelium, with slight ulceration of the external lips, but this disease, which was specially investigated by Surgeons-General Gordon and Smith on my representation to Government, was thought to be a form of scorbutic cachexia, depending on the absence of some essential ingredient in food, and the cases generally improved, and diminished in frequency under an improved dietary. In the Coimbatore Jail the prisoners suffering from this affection must have advanced to a further stage of privation, as in them the results were very fatal.*

Deaths from Debility.

307. Lastly, amongst the causes of death in jails, the large number of 436 are recorded as simply weakness or "debility," and as these deaths occurred almost entirely in the famine area, they must be set down to the losses of the famine. Ten deaths only are entered as directly due to "privation," but in reality the whole excess mortality of the year is primarily due to the food scarcity. The following table shows the enormous increase in mortality from bowel disorders in 1877.

Table showing principal Causes of Mortality in Jails,

Years.	Death-rate per Mille.				
	Cholera.	Dysentery.	Diarrhœa.	Dropsies.	Anæmia.
1861-62	26·3	8·5	14·6	...	...
1862-63	23·0	7·2	14·5	...	...
1863-64	15·6	16·5	17·5	...	...
1864-65	21·3	18·2	30·9	...	...
1865	30·0	12·8	22·7	...	...
1866	25·5	14·3	34·6	...	...
1867	0·8	8·8	10·5	5·3	12·1
1868	0·2	5·5	7·3	1·9	5·7
1869	4·3	6·6	7·3	3·3	2·4
1870	1·5	3·6	4·6	1·6	1·5
1871	0·7	2·9	2·3	0·8	0·3
1872	1·3	3·9	4·5	0·9	1·2
1873	0·1	5·9	6·0	2·5	0·4
1874	0·0	5·3	5·3	1·9	0·9
1875	4·1	6·4	7·7	3·5	0·9
1876	10·0	7·7	5·3	2·2	0·9
1877	25·7	32·1	50·1	5·8	2·0

* While these sheets are passing through the press, I learn that this affection has reappeared in the Coimbatore District Jail.

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308. Lamentable as have been the results in regard to the great body of prisoners, of whom we have accurate statistical evidence, it only remains to be said that the prisoners, from the moment they came under charge of the police, were in much more favourable circumstances for recovery than the bulk of the honest poor who pined away in their own homes, or who, as a last resource, wandered away to relief centres or the chief grain markets in search of work and food. Great as was the mortality in jails, it was exceeded in relief-camps. Considering the many millions who for months together were pinched for their daily food, and who ate anything and everything that afforded a chance of staying the cravings of hunger, it is wonderful that only 70,000 of these despairing creatures should have passed into jail for periods beyond one month. The number of petty offenders whose imprisonment was carried out in Subsidiary Jails or lock-ups is not included in these jail returns, and I have no figures bearing on the subject; but from examination of many Subsidiary Jails I know that they were overcrowded, and that the mortality was unusually high.

Deaths among Convicts and Under-trial Prisoners.

309. The proportion of mortality amongst under-trial prisoners for the whole of the jails was rather more than for convicts, the ratios being 189·3 per mille and 173·5 per mille respectively, but the mortality was highest amongst the classes in jails for short periods of under twelve months, and this will explain in a great measure the wide difference between the Central and District Jails.

Jail Dietary.

310. The usual dietary of the Madras Jails includes the staple food-grains of the several districts, to the exclusion of rice as a rule. But owing to the famine and the absence of stocks of dry millets in the markets such as ragi, cholum, and cumboo, rice had to be used in lieu of the customary food. In this respect the prisoners were no worse off than the great majority of the civil population, who could not depend upon getting any other ordinary grain but imported rice; but there is no doubt that a change of the principal staple of food is always a very serious matter, and I am quite convinced that in regard to the working population of the Ceded Districts who are unaccustomed to rice, that the results were peculiarly disastrous.

311. Amongst some of our younger Medical men and Jail Superintendents, inexperienced in the habits and customs of the people in regard to food, there is generally a desire to employ a rice diet in jails on the breaking out of sickness. As a matter of fact, a rice dietary has been forced upon us almost everywhere during the past year, and so far from saving the people from cholera and bowel-complaints, we have never before had such extreme fatality. It is quite true that the prisoners if consulted on the matter would generally prefer to eat a rice diet in jails, but as nine-tenths of the working classes never eat that grain, except on feast days, in their own homes, it is quite clear that the use of anything but the coarser millets in jail dietaries ought to be generally discountenanced.

These millets contain more albuminates in a given weight, and being the ordinary fare of the people are better digested, and tend to keep up the vitality of the people better than rice. I would have given a great deal to have been able to substitute cholum and ragi for rice in the relief-camps of the interior during the main crisis of the famine. A true knowledge and acquaintance with the habits and usages of the people will prevent jail officials taking up erroneous views on this subject.

Jail accommodation.

312. In regard to jail accommodation during the year every district had such an excess of prisoners that the existing jails could not possibly hold them. At Bellary where there is permanent accommodation for 450 persons, I found at one of my inspections upwards of 2,000, and a similar state of things existed at Coimbatore, Madura, Salem and Nellore; but as numbers increased temporary structures, enough to protect from sun, rain, and wind at night, were speedily run up by prison labour. Some of the temporary jails, as at Vellore and Bellary, were remarkably good. The enormous number of prisoners unfit for hard labour, provided Superintendents with ample means of ensuring cleanliness both of the old and temporary jails, but with all precautions there was much overcrowding at times, and no doubt the overcrowding was an additional

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disadvantage, and helped to increase fatal sickness. In Bellary Jail an outbreak of hospital gangrene was apparently aggravated by overcrowding.

Sickness and Mortality compared with the Mean of former years (Jails).

Jails.	Mean of 7 years ending 1876.			1877.		
	Admissions.	Daily Sick.	Died.	Admissions.	Daily Sick.	Died.
F. Bellary	701·2	26·0	20·2	976·8	51·0	317·8
Berhampore	664·7	28·9	47·0	545·1	24·1	79·4
Cannanore Central	658·6	32·2	36·0	962·7	63·5	110·5
P. F. Calicut	779·8	23·0	50·3	705·3	38·3	219·9
F. Chingleput	1508·7	54·7	11·6	1617·5	63·0	140·0
F. Chittoor	1304·3	44·0	30·4	2268·2	75·3	536·5
F. Coimbatore Central	412·1	19·0	28·3	601·4	38·0	117·2
F. Do. District	1293·4	70·0	65·8	2099·8	94·6	657·2
F. Cuddalore	778·8	25·1	18·6	745·3	17·9	76·2
F. Cuddapah	1431·5	38·5	41·4	855·6	28·7	119·7
F. Guindy	1362·3	28·5	...	656·7	20·1	44·7
Guntoor	972·7	35·0	9·0	245·5	11·2	7·5
Her Maj.'s Jail, Madras (*Civil Debtors'*).	1259·2	24·0	...	2352·9	78·8	...
F. Kurnool	1102·0	33·9	54·4	*1355·6	*38·9	*307·0
F. Madura	418·3	18·3	45·7	1334·2	47·7	300·0
Mangalore	1161·2	43·6	48·3	1531·9	59·4	63·8
Masulipatam	1000·0	38·4	...	442·7	19·2	7·6
F. Nellore	683·6	22·3	20·4	1265·4	44·3	195·5
Ootacamund European	500·0	32·3	...	1375·0	37·9	41·6
P. F. Ootacamund Native	527·9	18·6	24·8	1101·8	50·2	57·3
Palamcottah	477·1	17·2	38·5	458·7	11·0	26·7
F. Penitentiary, Madras	827·1	31·1	13·7	656·0	23·7	27·2
Rajahmundry Central	794·4	41·2	15·0	1067·5	69·0	23·1
P. F. Do. District	1095·7	45·3	31·9	1125·6	55·7	26·1
Russelcondah	1178·9	35·6	21·0	1404·4	27·3	*29·4
F. Salem	892·7	15·8	18·0	1756·7	40·0	168·5
P. F. Tanjore	596·1	37·7	76·9	586·2	28·2	148·8
Tellicherry	739·7	30·4	27·3	651·7	25·9	71·3
Tranquebar	792·3	31·6	61·5	696·2	21·4	56·9
Trichinopoly Central	360·0	19·1	38·3	273·2	11·1	53·7
F. Do. District	709·9	31·4	45·8	†418·1	†21·5	†115·1
F. Vellore Central	626·0	21·1	13·8	546·1	18·6	22·0
P. F. Vizagapatam	561·6	24·4	65·0	789·2	19·7	174·8
F. Palghaut Fort	...	...	...	1553·0	60·1	165·4

F. signifies Famine Area. P.F., Partial Famine Area.
* Camp Jail, Kurnool, included, † Camp Jail, Trichinopoly, included.

SECTION V.

GENERAL POPULATION.

Population under registration.

313. The record of births and deaths during the year does not extend to the whole population as ascertained at the census of 1871, viz., 31,597,872. Certain large tracts of zemindary estates and of country inhabited by wild tribes furnish no birth or death registrations, and the total population for which returns were received was only 29,209,542, or more than two millions short of the actual population.

Increment of population not estimated since 1871.

314. It must be noted here that as yet no attempt has been made to estimate the annual increment in the population since the date of the last census. We have no accurate data at present to show what the normal increment of the population has been in past years; for the census of 1871 was the first of the kind that gave the entire population with complete accuracy. It would in ordinary times be quite safe to add on one, or

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even one and a half per cent. for each year as the estimated growth of population, but a season like that of 1877, with widespread famine and pestilence over two-thirds of the area of the Presidency, tends so much to the rapid reduction of population, that it has been thought better to base the ratios of births and deaths on the ascertained figures of 1871, rather than on an estimated increase that the next census in 1881 will probably prove to be entirely fallacious.

Registration of vital statistics.—System of.

315. The year 1877 has been a period of trial for our system of registration of vital statistics, and it is not at all surprising that the inherent defects of the system have come prominently into notice. The system, as explained in former reports, is based on the theory that as each village in the country has a staff of public servants, and especially a functionary who keeps the revenue accounts of the village, this village accountant must have cognizance either of his own knowledge, or through the village watchmen and scavengers, of every birth and death occurring within his jurisdiction. In some instances the theory and practice are in accord, and in ordinary years the registration, though never quite perfect, is fairly trustworthy. But in many of our districts the villages comprise areas of many square miles, including detached hamlets, and the accountants have to trust to the information given them by subordinates: while in cases of zemindary estates, the village servants are not amenable to the revenue authorities of the district, and what with carelessness in the primary village record, and omission to send in returns, the aggregate result has never been so full and complete as is desired.

316. It must be remembered that as regards our village service, the law does not compel the officials to make returns of births and deaths. In Municipal towns we have the aid of the law, and consequently better results are secured. I have repeatedly recorded my opinion that the time has come for an alteration in the law rendering it compulsory on village servants to keep and return accurate figures in regard to additions and losses of the village populations, and I am quite sure that the actual facts of 1877 will prove the necessity of the reform advocated.

Utility of registration.

317. The actual utility of the past registration has never been over-estimated. The defects of the system have been freely admitted, and as an absolute record of births and deaths the figures have never been relied on. But the absolute correctness of the figures collected by over 50,000 village officials, who have no intercommunication, is not essential to the use of those figures as relative means of comparison. The errors of omission are a tolerably constant quantity, and can be allowed for. It is perfectly well known, and freely admitted, that the actual birth and death-rate is never shown by the registers; but with all imperfections, the past *record*, of deaths especially, has had a value of its own in showing the relative prevalence from year to year of epidemic and pestilential diseases. To take epidemic cholera as an example, we find in the year 1874 our large army of more than 50,000 town and village registrars recording only 313 deaths from that disease, while in 1877 the same officials send in returns of 357,430 fatal cases. What is the explanation of the astounding difference in the returns of the two years? It is simply this, that in 1874 the length and breadth of the country as proved by the collateral evidence of Revenue Officers, Police, Jails, Military establishments, &c., was practically free of the pestilence; while the same evidence shows that in 1877 cholera was almost universally prevalent. The registration in fact, though in neither instance dealing with absolute figures, shows the relative proportions of mortality and the geographical distribution of pestilence, and yields facts of the very highest interest.

318. And in regard to the very great mortality registered in the famine districts in 1877, objections were taken at the time I pointed out the true significance of the death-rate, that our ordinary registration was so defective, that we did not know what was the normal death-rate of the people. These objections of course had no force as regards the value of the registration work for comparative purposes. If, for instance, we find that the death registration of certain areas leaps up suddenly to three, four, five, or six times the average registration of the same areas for a mean of five or more corresponding seasons, we may be quite certain that the absolute mortality has borne a corresponding relation to the registered mortality, therefore, if in ordinary seasons we do not register more than two-thirds of the

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actual deaths, or even in a season of extraordinary mortality the registered mortality shows a similar or even greater shortcoming.

Difficulties of registration during 1877 consequent on the famine.

319. The difficulties of registration in 1877 have been enormously enhanced by the famine. The usual practice is to remunerate village servants for their public duties by rent free land, or a share of produce; but in a season when the land has been utterly unproductive over large tracts of country, the village servants have suffered just in proportion to the ordinary population, and consequently in those parts of the country where distress fell suddenly upon the people, as in Bellary, Kurnool, and Nellore, the village servants, in common with the other inhabitants, often wandered away from their homes in search of food or work. At this time there was little or no duty in connection with the land revenue or accounts, the labor of registering births and deaths was one that was not specially paid for or enforced by law, and there is no doubt that in very many villages of the famine districts the registration was greatly neglected, especially in the early months of the year.

320. Another source of defective registration was the restless wandering of the poor during the times of greatest famine pressure. When all the small accumulations of prosperous seasons had been spent or mortgaged, and when food failed, the people would set out from their villages hoping to reach some place where food or work might be obtained. Many thousands failed to reach the goal of their hopes. They perished by the road-sides, in ditches, in jungle-paths, and away from human habitation, and, as a rule, no record was made of such deaths. It was no uncommon thing for district officials in their tours across country to come upon numerous dead bodies and skeletons in the course of a morning's ride* and whatever might have been the numbers of those who died away from all aid, an d without the usual rites and ceremonies observed for the dead, it is probable that all mortality occurring in this way was left unregistered. As the arrangements for relief became more systematised, and camps and relief-centres were multiplied, the proportion of deaths of this description diminished, but until May or June it is quite certain that a very considerable proportion of the deaths amongst the famine-stricken escaped registration.

Registration nevertheless represents the intensity of the famine.

321. But notwithstanding all the disorganization of village service, and the disruption of family and social life, it is simply marvellous how the death registration has served to pourtray the intensity of the famine in almost all parts of the country where the people have died in immense numbers. I say "almost all" because the district of Nellore for many months together failed to return in the mortuary statistics anything like the number of deaths that must have occurred in a district so sorely distressed. And in Coimbatore also the actual mortality is not adequately represented by the registration. In both these districts in ordinary years registration is habitually very imperfect and unsatisfactory. In Madura also for more than one-third of the whole population in the zemindaries of Ramnad and Shivagunga no returns are received. Nothing like the whole losses of the population by famine are shown in the death registers, but the recent census of selected areas of the famine districts proves that, as a rule, the relative intensity of the famine in different circles is fairly represented by the mortuary registration.

Registration should be made compulsory by law.

322. The events of the past year have brought into such prominence the importance of accurate vital statistics, that it is to be hoped no time will be lost in requiring by law an accurate registration of the births and deaths of the people, and such improvements in the village communal system as will tend to secure this result.

Improvement in compilation suggested.

323. I may note further in reference to this subject that I am not at all satisfied with the method of dealing with the vital statistics after they have been rendered by village accountants. The practice at present is for the whole of the village returns to be sent to the office of the chief revenue authority, where they are compiled and classified by one or two clerks specially entertained for the purpose. But any one conversant with the routine of

* "It was no uncommon occurrence to find from eight to ten dead unburied corpses lying by the side of the road during a morning's ride, and the actual number that died during these outbreaks will probably never be known."—*Pamphlet on the Madras Famine, by a Madras Civilian.*

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official work knows that it is impossible for Collectors of districts to exercise practical supervision over clerks employed on such a duty. Practically there is little or no check on the accuracy of the compilation from the village returns. Revenue authorities can exercise great influence in making the village records accurate, but the subsequent compilation of these returns would be better checked by professional supervision. My own view is that the Civil Surgeon of a district, who is *ex-officio* the sanitary authority of the district, and the adviser of Municipalities and Local Fund Boards in sanitary matters, should be entrusted with the supervision of the clerks engaged in the compilation of vital statistics. It is most important that he should be acquainted with the state of public health in his district, and nothing would bring the matter so practically before his mind as the overhauling of the death returns. The clerks would have a recognized authority to appeal to in case of doubt or difficulty as to the classification of deaths, and the confusion in regard to the entries under "bowel-complaints" would probably cease under such a system of check or control. Lastly, the attention of the Civil Surgeon on the spot would be at once directed to unusual mortality in localized areas, and he would be able to call for explanation in regard to all remarkable entries.

A system of this nature would be more satisfactory to the Sanitary Commissioner, and by it Government would be able to place more reliance on the returns than at present.

Registration of births.

324. The registration of births was attempted for the first time in the year 1869, or three years after the death registration was commenced. The success of the experiment has varied greatly in different districts. In Tanjore, Salem, Trichinopoly, Chingleput, and some other districts a very fair measure of success has been obtained. In others such as Ganjam, Vizagapatam, Nellore, Madura, Coimbatore, and Malabar the birth registration has been habitually defective, with little tendency to improve, notwithstanding the frequent representations to district authorities on the subject. While registration is not compulsory by law, rapid improvement is scarcely to be expected, but there ought to be no more difficulty in registering a birth than a death, and the experience of many districts, which in ordinary seasons return a surplus of births over deaths, proves that the difficulties even without legal powers are not altogether insurmountable.

325. During the past year there has been a very marked falling off in birth-registration. Up to the year 1876 a steady and progressive improvement in numbers had taken place, but in 1877 the registered births diminished by nearly twenty-five per cent. of the gross numbers of the two preceding years.

The following table shows the actual number of births registered in each year with the ratios of births to population :—

Birth Return compared with previous years.

Years.	Births.	Ratio per 1,000 of Population.	Remarks.
1869	452,410	18·5	Census figures of 1866-67.
1870	439,063	18·1	
1871	517,109	21·0	
1872	554,379	18·3	Census of 1871.
1873	538,123	17·7	
1874	580,709	19·1	
1875	638,771	21·1	
1876	632,113	21·6	
1877	477,447	16·3	

NOTE.—The population furnishing birth returns varies from year to year, and the ratio is calculated on the census returns of the populations furnishing returns.

326. We see that in 1877 the actual numbers registered were 477,447, and that the ratio of births to population of the whole Presidency in that year was only 16·3 per mille, against 21·6 in the preceding year. A diminished birth-rate therefore of more than five per thousand calls for some special explanation.

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327. Of the total births 246,840 were male, and 230,607 female children. The proportion of male births to male population was 16·8, and of females 15·8 per mille. For every 100 female children registered there were 107 males. This proportion of male births is not excessive, for the accurate registers of the Madras Lying-in Hospital for a long series of years show even a higher proportion of male to female births. In only one district (Ganjam) of the twenty-one revenue divisions of the Presidency was there registered an excess of births over deaths.

Numbers of each sex born.

328. In 1876 there was registered an excess of births over deaths in *nine* districts. In 1875 *twelve* districts showed an excess of births over deaths. It will thus be evident that the causes of mortality have been general throughout the Presidency in 1877. But an increase in mortality does not explain why the births should have diminished by 25 per cent. of the mean of the two former years, and we have yet to inquire into the circumstances of the districts which have shown the lowest birth-rates.

Relative registration of births with deaths.

329. If we separate from the general abstract of births the number occurring in the worst famine districts, and compare the results with those of districts only affected by scarcity or high prices, we shall be able to obtain a general idea in regard to the influence of famine on birth-rates.

Diminished births the direct influence of the famine.

Famine Districts.	Births.	Ratio of Births to Population.
1. Nellore	7,692	5·5
2. Chingleput	12,468	13·3
3. Madura	20,627	15·5
4. Kurnool	10,507	11·4
5. Cuddapah	14,626	10·8
6. Bellary	22,428	13·4
7. North Arcot	25,591	13·2
8. Salem	25,666	13·0
9. Coimbatore	21,701	12·3
Total ...	161,306	12·2

330. The town of Madras has been purposely omitted from this list of famine districts, as its population during nearly the whole year was so much augmented by influx of immigrants that the births show an abnormally high ratio to census population. Other districts* in which scarcity developed into general or partial famine later in the year are left out also in the following list:—

* Neilgherries. South Arcot. Tinnevelly.

Non-Famine Districts, but subjected to scarcity and high prices.	Births.	Ratio of Births to Population.
1. Ganjam	22,933	19·6
2. Vizagapatam	23,412	15·1
3. Godavery	30,828	19·3
4. Kistna	22,292	15·3
5. Trichinopoly	28,967	24·1
6. Tanjore	54,626	27·6
7. South Canara	18,659	20·3
8. Malabar	40,440	17·9
Total ...	242,157	20·0

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331. The main results therefore as regards the influences of famine on birth-rates may be seen in the following table :—

Districts.	Population.	Births.	Ratio to Population.
Nine Famine Districts	13,313,214	161,306	12·2
Eight Non-Famine Districts ...	12,619,566	242,157	20·0

It is clear from these figures that wherever famine has been widely developed there has been a marked diminution in the birth-rate. Irregularities in registration do not at all explain the phenomenon, for the very districts which have been sending in monthly diminishing numbers of births have been recording four or five times the average number of deaths.

Observations in regard to effects of famine on fertility.

332. Long before the statistical evidence on this point was available, my attention was called to the large number of infants in the famine districts who at birth showed all the marks of being famine-stricken. Frequently in such cases the mother had no visible signs of starvation, but her previous poor living had had the effect of starving the fœtus *in utero*. It seemed probable that if this effect had followed in the case of women already impregnated, a prolongation of the bad feeding would result in a temporary suspension of the female functions leading to conception. Further experience in the examination of many thousands of females on the relief-works went to show that pregnancy was a comparatively rare condition, and in my letter of instructions* to the nine Inspecting Sanitary Officers placed at my disposal by Government for duty in the famine districts, special attention was directed to be made to the condition of the women as regards pregnancy. The result of the inquiry was an overwhelming amount of evidence to show that pregnancy in the famine-stricken (after the earlier months of distress) was a very rare condition; that in young women the period of puberty had been retarded; and that the special functions relating to generation were, in the more marked cases of physical emaciation, altogether in abeyance.

333. In all the previous literature connected with Indian or other famines this important matter as regards the up-keep of a population has, so far as I know, never received any practical notice, and I have to claim for myself whatever credit may be due for the enunciation of a truth of the very highest interest in connection with the physiological and pathological results of famine, viz., that chronic starvation of a population causes diminution not only by death, but by arresting more or less completely the normal increase by birth.

Diminished birth-rate to be expected in the corresponding months after the famine.

334. This subject will be dealt with in greater detail in my special report "On the Medical and Sanitary Aspects of Famine," and it will only be necessary to remark here that if the theory is based on fact, the confirmation of it must be looked for in the fewer births of the population in the months corresponding with the greatest intensity of famine. The months of July and August were undoubtedly the period of the year in which the privation of the people was most general, and if the conceptive functions in women fall into abeyance in proportion to the prevalence of distress, we may expect to find in the registered births of the population, nine months after the worst famine period, a relative diminution in the recorded birth-rate.

335. It is of course admitted that the registered births at no time represent the actual births; but for comparison with registration in ordinary years the birth registration during and after the famine period may unquestionably be referred to in corroboration of the fact testified to by so many witnesses, that the births throughout the famine tracts have been decreasing, even after the intensity of the food-scarcity has passed away.

336. On this subject I cannot do better than include an extract from my report on birth and death registration for the month of December 1877 (letter No. 216, of 5th March 1878).

* No. 242 of 6th April 1877, paragraph 7, IV. Head.

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The table given in that letter showing the diminishing ratio of births is continued down to the latest month for which the registration statistics have been received.

"I am well aware of the fact that the registration in this Presidency cannot be taken as an accurate index of the actual birth-rate of the people. The system of reporting births is comparatively new, and we have never yet attained thoroughly trustworthy results, except in a few Municipal towns, and, perhaps, the district of Tanjore. But until the year 1877 there was a steady increase in the annual registrations, and I have no doubt that the increase would have continued had not distress and suffering been common amongst the poorer classes throughout the year.

"5. It cannot be said that registration as a whole has fallen off in 1877, for in the areas of country most severely affected by famine, the death registration has been four or five times in excess of the average registration of the past five years. Nor can it be supposed that the many thousands of village servants scattered over the country, who are employed in recording the births and deaths, have entered into a combination amongst themselves to render fictitious entries of deaths, and to systematically omit the births in their several villages. The fewer birth registrations therefore in the latter months of 1877, considering that they bear a direct relation to the severity of famine in the several districts, must be due to the fact that fewer children were born in these months. The fact is admitted by the independent testimony of every officer who has been engaged on famine-relief, and the registration of births, imperfectly as the work may have been accomplished, has served to establish a great truth, viz., that famines not only reduce a population by undue mortality, but by suspending for the time being the natural process of reproduction.

"6. In an earlier notice of this subject, I stated that if my interpretation of this fact was the right one, evidence to that effect would be found in the diminution of birth registration in the months corresponding with the intensity of suffering from famine in the various districts. The following table shows the ratio of births to population in certain affected districts from August 1877 to June 1878.

Registered Births per Mille per Annum in Famine Districts.

Districts.	Average for five years.	August 1877.	September 1877.	October 1877.	November 1877.	December 1877.	January 1878.	February 1878.	March 1878.	April 1878.	May 1878.	June 1878.
Nellore	13·0	7·4	6·3	4·8	3·2	3·05	2·7	2·5	3·6	3·9	4·4	4·3
Chingleput	23·0	16·7	12·4	11·7	10·4	9·1	7·1	5·6	5·4	4·4	6·7	10·04
South Arcot	18·3	23·1	18·7	17·0	14·7	13·8	9·5	6·8	6·6	5·7	6·6	6·8
Madura	18·4	15·1	12·9	10·9	10·6	9·1	7·4	6·1	5·4	4·9	4·7	5·8
Kurnool	19·5	9·0	8·1	7·5	5·9	4·3	3·6	2·9	2·9	2·9	3·3	2·6
Cuddapah	17·0	10·6	8·4	7·9	7·5	5·6	4·4	3·5	3·6	3·4	4·4	4·4
Bellary	22·4	11·1	10·3	9·04	8·1	6·8	5·5	4·8	4·5	4·2	4·3	4·7
North Arcot	22·8	15·3	11·4	9·8	8·6	7·6	5·7	4·2	3·7	3·2	4·1	4·4
Salem	24·3	11·8	8·4	8·6	8·1	7·2	6·04	5·5	4·3	3·8	3·9	3.9
Coimbatore	15·7	10·7	9·7	8·9	7·8	7·1	6·2	5·05	5·1	4·3	4·3	4·3

NOTE.—This table shows the lowest birth ratios in *March* and *April* 1878, as was anticipated. The returns for May and June indicate in some districts a slow recovery of the people in regard to fertility.

"7. I have begun this comparison with the month of *August*, because that month, as regards births, represents the condition of the population favoring fertility or otherwise in *December* 1876. In the month of December actual famine was present in Nellore, Kurnool, Cuddapah, Bellary, and Salem, and we see as a consequence very low birth-rates in August, diminishing month by month to the end of the year in those districts. In South Arcot there was little or no distress in December 1876, and consequently the birth-rate in that district is not apparently lessened in August 1877, but with each succeeding month we find a decrease, the ratio falling from 23·1 per mille in August to 6·8 in June 1878. In North Arcot and Madura distress was not general in December 1876, and the birth-rates in August, though lower than usual, were not excessively low; but the diminution in the last five months of the year was very steady. The December returns in fact show lower birth-ratios throughout the famine area than any previous month. As the intensity of famine was highest in the month of *August* 1877, we may fairly assume that the diminution in birth-rates in the several affected areas will go on until the month of April or May 1878, after which time a gradual rise may be expected, corresponding to the persistence or otherwise of scanty food-supplies in the several localities.

"8. The district of Salem is one in which much attention has been given in past years to the improvement of birth registration. The ratios for three previous years are marginally given. There is no other explanation of the steady diminution of birth-rate from 18·1 per mille in January 1877 to 3·9 per mille in June 1878, but the enfeebled condition of the population by prolonged scarcity and famine. The figures themselves

	Ratios per Mille.
1874	25·5
1875	24·1
1876	25·1

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are all probably below the truth, but the monthly ratios of the year of scarcity and distress lose none of their force when we use them for comparison with the results of ordinary years, and when used in this way, they testify, beyond the shadow of a doubt, to the fact I have been at some pains to establish, that famine has a two-fold effect on population in destroying life and hindering reproduction. The necessity of recognising this latter feature of the famine is just as important as the other established fact, that no food-dearth can pass over a population without causing undue mortality. The prosperity of a country depends on the amount of human labor engaged in productive occupations, and, if the labor supply be for any length of time cut off at both ends, the future well-being of the country must be seriously imperilled. One bad famine year may thus be the means of hindering national development for a long series of subsequent years."

337. The table just quoted shows in the clearest manner how month by month the births in the famine area have been dwindling away just in proportion to the distress amongst the population. Throughout the present year it may safely be assumed that the birth-rate will remain low, although from the present improved physical condition of the survivors of the famine, the number of births may be expected to increase before the end of 1878.

Practical deduction.

338. The practical deduction in regard to this matter is that famines have to be looked at, not only from the administrative point of view in finding food and work for the distressed, but that the adverse influences of privation on health and reproduction demand closer attention than has yet been accorded. Famine brings in its train a number of abnormal conditions which have to be investigated by scientific methods from a physiological and pathological point of view, if we wish to understand the full measure of such a calamity as has recently befallen the people of Southern India. Probably the experience of the past year will be held of sufficient importance to demand that in future famines, the principles of relief may be founded on the sound basis of physiological truth. It is quite certain that accurate knowledge in regard to the means of maintaining the physique and vitality of a people cannot in future be displaced by empirical methods of dealing with the questions of food and labour.

Registration of deaths.

Deaths among each sex compared.

339. The total number of deaths registered in the native population during 1877 was 1,556,312, or nearly three times the average registrations of the previous five years. In regard to the numbers of the sexes 857,315 were males and 698,997 females. The numbers of the living population in 1871 give no warranty for the comparatively small number of female deaths registered, unless special causes have been at work to induce an unusual mortality of the male population. In the previous five years the proportion of male and female deaths to population was 18·8 and 17·4 per mille respectively, but in 1877 the proportions were 58·4 (males) and 48·06 (females) per mille, and the great disparity in the past year is, I believe, due in some degree to the imperfect way in which female mortality was registered, especially in the famine districts, and partly also to the greater liability of the men to death. The mortality returns of relief-camps show that while males were more liable to perish from famine than the females, more females than males were treated in the camps. The registered death-rate for the whole population was 53·2 per mille, but this rate, excessive as it is, gives I fear but a very imperfect idea of the actual mortality of the people in the parts of country affected by famine.

Comparison with former years.

Classification of deaths imperfect.

340. The following table shows in abstract form the means of comparing the mortality of 1877 with the results of eleven previous years. It will be seen that under every one of the four great classified causes of death, as well as under unspecified causes, there has been an enormous increase in the registered mortality. The classification of the causes of death in this country is still very imperfect, and must continue so as long as we have to depend on unprofessional opinion for the facts. During the past year there has been more difficulty than usual in the classification, inasmuch as the deaths from cholera and fevers were not always easy to diagnose from the last stages of famine diseases even by professional persons. I have myself frequently seen persons alleged to be dying of cholera, who in my judgment were merely the victims of famine—the watery and mucous diarrhœa, resembling cholera stools, being only the ultimate stages of chronic bowel disease induced by a long course of chronic starvation; and as regards "fevers," it is well known that in the cold months of the year pneumonia and lung congestion

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accompanied by high temperature, and what the natives described as "fever" cut off many thousands of those who had been weakened and reduced by famine. The registration of the actual "causes of death" therefore was probably to a great extent incorrect, but the gross numbers registered indicate unmistakably that some very powerful cause was in operation to induce so unusual a mortality.

Deaths from principal Causes compared with previous years.

Years.	Total Deaths.	Cholera.	Small-pox.	Fevers.	Bowel-complaints.	Injuries.	Other Causes.
1866 ...	600,106	200,961	23,106	110,102	...	9,047	256,890
1867 ...	372,026	33,205	27,907	112,511	...	8,613	189,790
1868 ...	390,959	8,036	34,330	105,692	...	9,242	233,659
1869 ...	451,981	21,034	17,448	132,346	...	9,310	271,843
1870 ...	451,020	55,867	11,252	151,027	...	12,325	220,549
1871 ...	444,371	17,656	20,823	192,469	38,928	15,323	159,172
1872 ...	508,182	13,247	39,074	214,148	39,387	15,150	187,176
1873 ...	513,232	840	51,784	222,843	36,392	14,251	187,124
1874 ...	521,329	313	48,343	226,220	37,993	13,065	195,395
1875 ...	641,260	94,546	24,775	252,042	37,484	12,421	219,992
1876 ...	680,384	148,193	23,469	230,092	38,176	11,175	229,279
1877 ...	1,556,312	357,430	88,321	469,241	133,366	16,460	491,494

Deaths according to age.

340a. The mortality in 1877, as influenced by the famine, has fallen with especial severity on the young and old, and even the adult able-bodied of both sexes have died in unusual numbers. If we divide life into four periods—infant life, child life, adult life, and aged life—the following results in numbers may be shown for the year 1877, contrasted with the results of previous years :—

Ages.	1873.	1874.	1875.	1876.	1877.
Infants unable to wa lkunder 1 year)...	93,019	88,856	96,457	90,586	109,849
Boys and girls 1 to 12 years.	111,517	110,690	149,449	155,514	405,484
Adults (men and women) 12 to 50 do.	162,828	172,011	231,661	262,824	635,706
Old people (do.) over 50 do.	145,868	149,772	163,693	171,460	405,273

341. The relative proportions of deaths at the several ages are best shown in ratios to population, but the infant population is not separately given in the census returns, so that the ages are taken as 1 to 6, 6 to 12, 12 to 50, and over 50.

Ages.	1873.	1874.	1875.	1876.	1877.
Infants from 1 to 6 years.	25·1	27·8	30·6	29·1	57·9
Boys and girls 6 to 12 do.	5·9	5·7	9·8	11·1	31·6
Adults (men and women) 12 to 50 do.	9·6	10·2	13·7	15·6	39·6
Old people (do.) over 50 do.	56·5	58·1	63·5	66·5	186·3

Deaths according to classes.

342. In the standard tables prescribed by the Government of India, the deaths are arranged to be shown in Table V (Appendix) separately for Hindus, Mahomedans, and others.

Mahomedans.

343. The Mahomedan population of the areas furnishing returns was 1,767,473, and the total deaths amongst this class of the community were 68,685, or in the ratio of 38·8 per mille.

Hindus.

344. The Hindu population includes nearly all the aboriginal and outcaste races, and amongst these the most abject and impoverished, at all times and seasons, of the native community. The population of these classes furnishing death returns was 27,442,069, and the total deaths 1,487,627, the death-ratio to population being at the rate of 54·2 per mille.

345. It is a fact worthy the attention of administrators in India that the death-rate of the Mahomedan people throughout the famine country has been considerably

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below that of the Hindu races, and the circumstance would seem to suggest that as regards the means of procuring a sufficiency of food the Mahomedans, as a class, were in better case than the Hindus.

Deaths among Mahomedans and Hindus in Famine and Non-Famine Districts compared.

346. The following table compares the death-rate of Mahomedans and Hindus in the famine districts:—

Mortality of Mahomedans and Hindus in Famine Districts.

Districts.	Death Ratio per Mille.	
	Mahomedans.	Hindus.
1. Nellore	34·4	48 4
2. Madras	82·5	125·1
3. Chingleput	31·6	66·9
4. South Arcot	32·3	55·7
5. Trichinopoly	34·1	56·1
6. Madura	41·1	60 4
7. Kurnool	85·5	95·0
8. Cuddapah	72·2	90·4
9. Bellary	70·1	94·5
10. North Arcot	35·3	84·8
11. Salem	43·0	91·4
12. Coimbatore	28·8	57·2
13. Neilgherries	87·6	71·7
Mean of the above Districts ...	56·3	74·1

347. The differences shown in this table are very remarkable. In all the districts except the Neilgherries, the ratio of mortality of the Hindus is higher, often double that of the Mahomedan communities in their midst. If it were possible to show the mortality of the Hindu castes separately, we should probably find equally remarkable differences in the death-rates of castes occupying different social positions. The Brahmans, in fact, would be shown to have suffered very little from the famine in comparison with the Pariahs, and "Pullies" who constitute so large a bulk of the agricultural laboring classes of the country.

348. As the ratios of Mahomedan mortality have been contrasted with that of the Hindus in the famine districts, it is only proper to show them for the remaining districts also.

Mortality of Mahomedans and Hindus in Non-Famine Districts.

Districts.	Death Ratio per Mille.	
	Mahomedans.	Hindus.
1. Ganjam	25·1	17·0
2. Vizagapatam	17·1	17·7
3. Godavery	13·8	20·8
4. Kistna	25·1	25·2
5. Tanjore	20·8	37·8*
6. Tinnevelly	28·8	41·0*
7. South Canara	82·8	33·5
8. Malabar	23·6	21·4
Mean of the above Districts ...	25·1	27·1

349. From these figures we see that in the non-famine districts the Mahomedans died in an equal, or in some districts in a greater ratio to the other classes of the native community. In Malabar, for instance, where more than a fourth of the people are Mahomedans, the registered death-rate was higher for this class than for the remaining portion of the native population. I instance this case to show that the lesser

* These two districts were overrun with emigrants from famine districts for some months.

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death-rate of the Mahomedans in the famine districts is not to be explained by indifferent registration in regard to that sect of the people.

The Mahomedan population engage in trade and agriculture to a considerable extent, and comparatively few of them work for daily hire. Their social position is no doubt above the average of Hindus, if amongst Hindus we include all the aboriginal and outcaste races who constitute the bulk of the poor.

Registration in Municipal Towns.

350. The registration of births and deaths in Municipalities has been a good deal disturbed by the events of the famine. In every severe food-dearth there is a tendency of the people to congregate in the towns, and the reason is sufficiently evident. When food is scarce and hardly to be bought in remote villages, there is more hope for the people in flocking to the food-markets, than in waiting for food to be brought to the villages. In this way the normal populations of the Municipal towns, especially in the actual famine area, were temporarily increased in 1877, but the ratios, both of births and deaths, can only be calculated on the known and ascertained populations, and for the past year they doubtless exaggerate somewhat the birth and death-rates of the resident town populations.

351. There were 48 towns under Municipal government during the year. Cumbum in Kurnool had ceased to be a Municipality, and the returns for that town are no longer shown separately. Mettapolliem and Caroor in the Coimbatore District have been added to the list of Municipal towns since last report. Mettapolliem enjoyed its Municipal privileges only for one year.

Population, births and deaths.

352. The town population, according to the 1871 census, was 1,604,188. In the 48 towns 43,771 births and 110,888 deaths were registered in 1877. The birth-ratio was 27·2 per mille against 28·6 per mille for the previous three years, and the decrease would have unquestionably been greater but for the accident of the town populations being augmented so much by famine emigrants from the districts. The contrast between the town birth-rate, 27·2 per mille, and the general birth-rate of the whole Presidency including the towns, 16·3 per mille, is very marked. The death-ratio, 69·1 per mille, is also much higher than that for the Presidency generally, 53·2 per mille, and is to be accounted for by the rush of famine-stricken to the towns.

Numbers of each sex born and died.

353. In regard to sexes, there were 23,063 boys and 20,708 girls born, and of the deaths 58,735 were males and 51,837 females. The chief causes of death in the towns were—

Cholera	19,631	or 12·2	per mille.
Small-pox	11,592	or 7·2	do.
Fevers	14,049	or 8·7	do.
Bowel-complaints	30,020	or 18·7	do.
Injuries	1,667	or 1·0	do.
All other causes	33,613	or 20·9	do.

Registration in Municipalities more accurate than in districts.

354. In the Municipal towns it is certain that registration is more accurate in regard to births and causes of death than in the districts generally, but for reasons already stated, the town ratios calculated on the normal population are scarcely reliable for 1877. But it is a matter of interest to compare the results of the registered mortality in the towns and of the districts generally including the towns.

Comparative Ratio of Diseases in Presidency and Towns.

Diseases.	Madras Presidency, including Towns.	Municipal Towns.
	Ratio per Mille.	Ratio per Mille.
Cholera	12·2	12·2
Small-pox	3·02	7·2
Fevers	16·06	8·7
Bowel-complaints	4·5	18·7
Injuries	0·5	1·0
All other causes	16·8	20·9

355. This comparison shows exactly the same ratio of cholera mortality for towns and districts, but a much higher ratio of small-pox mortality, bowel-complaints,

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and injuries in towns, while the "fever" death-ratio for the districts is nearly double that of the Municipal towns.

356. It must be noted that many of our Municipal towns had within them camps and famine hospitals, so that the higher ratio of "bowel-complaints" is to be explained from the fact that the famine sufferers in many instances came into the towns to die. The fact that the fever mortality in the districts was double that of towns, appears to show that the disease was *malarious* in character, and not especially connected with the famine or the insanitary conditions usual to town life. The increased mortality from small-pox in the towns points to the additional dangers arising from crowding the people together in famine seasons.

357. In some of the Municipal towns the mortality was exceedingly high, as Madras 118 per mille, Kurnool 169, Erode 252, Nellore 99, Tuticorin 131; but in most of these instances of very high death-ratios, the population was abnormally swelled by famine emigrants, and the death-ratios above shown are not calculated on the temporary populations. In fact, the towns have been so densely peopled during the worst part of the famine season that no fair deductions as to local causes of diseases can be drawn from their birth or death-rates in comparison with those of the districts generally.

SECTION VI.

GENERAL HISTORY OF CHIEF DISEASES.

Cholera.

358. There is nothing more striking in the peculiarities of the death-registration in the various provinces of India than the remarkable variation from year to year in the mortality from cholera.

In the Madras Presidency we have a succession of epidemic years, usually three in number, followed by one or more years of comparative repose. In certain parts of our Presidency cholera dies out after an epidemic visitation just as completely as it does in European countries, and for long periods of, in some instances, two or three years, the population is just as free of cholera as are the populations of Europe and America.

Our registers of mortality amongst the civil population extend only to the year 1866, a year in some respects very like that of 1877 in regard to seasonal phenomena. In 1866 we came to the end of a long drought, and of actual famine in Bellary and some other districts, and of very terrible famine in Orissa, and our own Northern District of Ganjam. 1866 was a year of intense cholera prevalence; the epidemic had been increasing all through 1865, and culminated in 1866. Although this was the first year of death registration, and the village registrars were new to their duties, no fewer than 200,961 deaths were returned as due to cholera. In 1868 the epidemic had almost entirely disappeared, and only 8,036 deaths were returned under this head.

In the middle of 1869 a new epidemic of cholera reached the Madras Presidency, which, however, was very mild in its effects compared with the previous visitation. The highest yearly mortality registered in this epidemic was in 1870, when 55,867 deaths were registered.

In 1873 and 1874 the cholera mortality had fallen to 840 and 313 deaths respectively, and during these two years nearly the whole length and breadth of the Madras Presidency enjoyed a complete immunity from the disease. This immunity continued until April 1875, when cholera, after being epidemic in Ceylon for some months, appeared in our southern districts of Tanjore and Tinnevelly, and from that time, influenced by seasonal changes and the condition of the people, continued to increase over nearly the whole of the Presidency, until the beginning of the year 1877, when it attained its maximum of prevalence and fatality. From the end of the first quarter of 1877 the general decline in cholera mortality was well marked, but in those districts of the northern division of the Presidency which had not previously suffered to any great extent, the severity of the cholera epidemic

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became developed only towards the end of 1877. And the same remark applies to the district of South Canara also.

359. The total deaths registered during 1877 as due to cholera, were 357,430, the largest number ever recorded. Of these 200,803 were described as males, 156,627 as females. In the previous five years, including 1876, which was a bad cholera year, the mean annual mortality from cholera was less than one per thousand (0·8), or in the proportion of 8 deaths to 10,000 living, but in 1877 the ratio of cholera mortality rose to 12·2 per mille, or to 122 deaths for each ten thousand of population.*

360. The absolute mortality from cholera was highest in January and February (January 58,712 deaths, February 51,211). In June the total deaths had fallen to 25,921. In July there was a slight rise, and in August the deaths numbered 31,737. From this time the mortality fell rapidly until the end of the year. In December only 7,292 deaths from cholera were recorded, and in only four districts was there evidence that the usual cold weather increase of cholera was going on at the end of the year. The great epidemic of 1875, 1876, and 1877 was in fact coming to an end, just as all other epidemics of cholera have done in times past.†

361. The coincidence of bad seasons in Southern India with maximum cholera prevalence is remarkable. Thus the year 1833-34 of the Guntur famine, in which more than 50 per cent. of the people disappeared, was also a time of maximum prevalence of cholera. The years 1853-54 which were years of drought, were also years of unusual cholera, and the same may be said of the years 1865-66, and especially of 1876-77.

362. There is no evidence to show any absolute connection between droughts and cholera epidemics, but so far as Southern India is concerned, it seems quite clear that cholera epidemics in their effects on population are intensified by the conditions produced by drought and scarcity. Cholera epidemics come and go also in years when the seasons and crops are normal, but in these instances, as in the 1869, 1870, and 1871 epidemics, the disease appears to touch very lightly a well-fed and prosperous community.

363. The experience of the past year shows that there was no relation between the prevalence of cholera in the population and the intensity of famine distress. The population generally in November and December 1876, when the great rise took place in cholera mortality, had only begun to feel the effects of the food scarcity; and at the time of greatest suffering from insufficient food in July and August, cholera was not half so fatal as in December 1876 and January and February 1877. Still there can be no question that the antecedent conditions of the famine did, in a very great degree, contribute to prepare the people to fall victims to this special form of pestilence.

364. In illustration of this fact it will be well to compare the cholera mortality of the districts affected by famine and scarcity with the results in those parts of the country which escaped famine.

Deaths from cholera in Famine and Non-Famine Districts compared.

365. In the following list is given only the districts in which famine existed at the beginning of the year :—

Districts.	Deaths from Cholera in 1877.	Ratio to Population.	Mean Ratio of previous 5 years.
1. Kurnool	10,451	11·4	0·2
2. Bellary	30,183	18·1	0·3
3. Cuddapah	33,102	24·5	0·8
4. Nellore	19,476	14·1	0·7
5. Madras	6,246	16·3	0·7
6. North Arcot	42,145	21·8	0·9
7. Salem	47,633	24·2	0·9
8. Coimbatore	36,622	20·7	1·6
9. Chingleput	4,391	4·6	0·5
10. Madura	15,647	11·7	1·1

* I am afraid that the facts of 1878, in reference to cholera, will show a newly invading epidemic, and not a mere recrudescence, coming down from the Central Provinces and Bombay.

† The registration of cholera mortality was a good deal confused with famine diarrhœa, and the number of cholera deaths included in the returns is probably exaggerated from this cause.—W. R. C.

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366. In the districts mentioned below, the scarcity developed into actual famine over partial areas or the whole district during the year 1877.

Districts.	Deaths from Cholera in 1877.	Ratio to Population.	Mean Ratio of previous 5 years.
1. South Arcot	25,783	14·7	1·1
2. Tinnevelly	14,214	8·3	1·1
3. Neilgherries	476	10·0	0·1
4. Kistna	12,374	8·5	0·2
5. Trichinopoly	15,447	12·8	1·5

367. In the next series of districts the resident populations were unaffected by famine, although some of the districts, as Tanjore, received many emigrants from famine areas. The figures show in what degree they were affected by cholera :—

Non-Famine Districts.	Deaths from Cholera in 1877.	Ratio to Population.	Mean Ratio of previous 5 years.
1. Ganjam...	3,290	2·8	0·8
2. Vizagapatam	6,932	4·4	0·7
3. Godavery	7,072	4·4	0·2
4. Tanjore...	13,098	6·6	1·9
5. South Canara	2,900	3·1	0·1
6. Malabar	9,957	4·4	0·3

368. These three groups of districts being affected by scarcity in different degrees, the following figures show the aggregate results in regard to the prevalence of cholera in the several groups :—

Groups.	Total Population.	Total Cholera Deaths.	Ratio per Mille.	Mean Ratio of previous 5 years.
1st Group (early Famine Districts)	13,610,813	245,896	18·0	2·01
2nd do. (later do.)	6,147,540	68,294	11·1	1·6
3rd do. (Non do.)	9,451,189	43,249	4·6	1·3

Greater preponderance of cholera in the famine districts and the cause explained.

369. A mere glance at these figures shows the great preponderance of mortality from cholera in the famine districts, and it is important that the fact should not be lost sight of. If we compare the cholera mortality of the 1st group of districts with the 3rd we shall find a ratio of 18·0 per mille against 4·6 per mille, and the difference is only explainable if we take into account the different conditions of the populations during the early months of the famine.

370. What were the special circumstances of the population of the famine area that predisposed them to suffer unduly from a cholera epidemic?

Owing to the failure of the north-east monsoon rains in the end of 1876, enormous numbers of agricultural laborers and small farmers were thrown out of work. As in agricultural work, the laborer is paid in grain and very rarely in coin, it follows that when the prospects of work became hopeless, there was no food to be had in the villages by the laboring classes, nor did they possess money to buy food. As soon as the food-dearth began, the lower classes of the villagers left their homes, making for the chief food-markets or centres of Government relief. The influx of applicants for work or relief was so great that district officials were utterly unable to cope with the proper organization of relief measures. The people were everywhere massed under unwholesome conditions, crowded in their daily tasks, and crowded in their sheltering places at night. The long drought and absence of the north-east monsoon rains had caused scarcity of water for drinking

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and bathing, and in regard to relief-works on the public roads, there can be no question at all that the few wells or springs available for the use of the people were often fouled in every conceivable way. Under conditions such as these, sudden explosions of cholera in groups of famine-relief coolies were almost inevitable, and in fact they were constantly occurring in those parts where relief measures were in progress during the early days of the famine. Then, again, the scarcity of grain and the usual articles of food caused the poorer classes to resort to extraordinary means of filling their stomachs. They ate the fibrous pith of the aloe stalk wherever it was to be had. Fruits of the Indian fig, prickly-pear, margosa, and leaves of many jungle trees—some nutritious and digestible, and others having probably only a mechanical action in distending the stomach. The people at first made a great effort to live; but as their usual food was not to be had, there can be no question that the digestive organs were often deranged by the use of strange and unnatural food, and that in this respect the populations of the distressed area were prepared to become the victims of cholera. All the normal insanitary conditions of native rural life, viz., bad feeding, bad housing, bad conservancy, and bad water, were intensified by the famine distress forcing the people to herd together in works and centres of relief.

Relation between the cholera mortality and the famine.

371. The relation of cholera mortality to the famine I believe to be this. The pestilence was present with us before the food-dearth began, but it was aggravated by the wandering habits of the famine sufferers, and by their aggregation in unusual numbers on works instituted for their relief, and in market towns and food centres, and also by the resort to strange and unnatural articles of diet, and by the use of contaminated water. Several of the localized explosions of cholera along roads where relief laborers were massed, appeared to be obviously aggravated by the use of contaminated water, but the sources of supply were so few that the people had to use bad water or perish of thirst.

372. But while the peculiar conditions of the people in famine times undoubtedly aggravate the mortality from that particular pestilence, it must be borne in view that cholera epidemics pursue their course quite independent of the accident of famine. In all parts of the country cholera has prevailed during some portion of the year.

373. There has been no relation between the intensity of famine and the intensity of cholera. Our food pressure was most severe in July and August, but the cholera intensity was at its maximum in January and February, when a large number of the persons attacked had not undergone the gradual decline of health from chronic starvation.

374. It was in the early months of the famine when the organization of relief measures was incomplete and the people had massed in disorderly crowds, that cholera committed such havoc amongst the population.

The prevalence of cholera in relation to water-supply.

375. In regard to the question of water-supply and cholera, it must be noted that owing to the general failure of the rains in 1875 and 1876, the subsoil water had receded generally to an unusual depth during the months when cholera was most virulent. The heavy rains of the cyclone in May relieved to a great extent the dearth of water for drinking purposes along the Eastern Coast line, but did not raise the level of the subsoil water so much as might be expected. With the plentiful rains towards the end of the year, in September and October the subsoil moisture reached its normal level, and in October, when most of the distressed districts had received good rain, the violence of the cholera epidemic had passed away. The districts of the northern division of the Presidency in which the latter rains failed, were in fact the only ones where cholera was actively progressing at the end of the year. The water-supply of villages, and in the neighborhood of large works throughout the "Ceded Districts," was very bad all through the early months of the year. The various tanks and wells were a good deal fouled, and the water stunk offensively. The reservoir for supplying the town of Madras ran so low that the water had to be pumped into the delivery channel, and when it reached the consumer, was very much of the consistence of green pea soup, and was offensive to smell and taste. In Madras, a large number of wells were

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cleaned out and brought into use to remedy the defects of the supply from the reservoir, but after the cyclone on the 20th May, the Water Works' supply was sweet and good, and an ample supply was available for the use of the town population for the remainder of the year.

376. Those who look to the condition of a water-supply as explaining the virulence of cholera epidemics will find ample confirmation of their views in the peculiarities of 1877. I have never before known the general water-supply of the people in so unwholesome and unsatisfactory a condition as in the first half of the year, and although a great deal of work was done in cleaning and deepening village wells and tanks, the scanty supply could not be remedied until plentiful rain had fallen and replenished the springs with a purer water.

377. It has been the practice to review the cholera history of each district and to show the number of villages and proportion of population affected in each year. The practice will be continued in the present report.

378. The total number of cholera deaths registered in this district was 3,290. There were two periods of greatest prevalence, March and April and November and December. The Gumsur and hilly ranges had very little cholera, and the epidemic prevailed mostly along the coast. The Municipal towns of Berhampore and Chicacole suffered severely, especially in November and December. The rainfall of this district was rather in excess in the early months of the year, but the rains of the north-east monsoon failed, and there was considerable food distress by the end of the year.

Ganjam.

379. Cholera deaths were registered in 317 out of 5,174 villages or towns.

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Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Ganjam District during each Month of the Year 1877.

Taluqs	Goomsoor.				Berhampore Municipal Town.				Berhampore Taluq.				Chicacole Municipal Town.				Chicacole Taluq.				Zemindaries.				Total.			
Population ...	150,330.				21,670.				191,039.				15,587.				150,743.				637,127.				1,166,496.			
Total No. of Villages in each Circle.	1,035.				1.				465.				1.				335.				3,337.				5,174.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January ...	1	287	1	3·4	...	...	...	...	1	1,317	4	3·0	...	...	...	...	1	3,543	1	0·2	...	...	...	...	3	5,147	6	1·1
February ...	...	...	...	...	...	...	...	...	5	7,582	6	7·9	1	15,587	21	1·3	12	16,289	32	1·9	6	3,123	14	4·4	24	42,531	73	1·7
March	6	2,682	9	3·3	1	21,670	67	3·0	33	32,951	99	3·0	1	15,587	25	1·6	20	30,254	141	4·6	71	74,872	347	4·6	132	178,016	688	3·8
April	4	3,329	5	1·5	1	21,670	9	0·4	15	17,684	47	2·0	1	15,587	2	0·1	14	14,428	78	5·3	45	35,152	328	9·3	80	107,850	469	4·3
May	...	...	...	...	...	...	...	...	4	3,528	9	2·5	...	...	...	...	8	10,591	22	2·0	43	44,469	193	4·3	55	58,588	224	3·8
June	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	871	15	17·2	4	3,711	5	1·3	6	4,582	20	4·3
July	...	...	...	...	...	...	...	...	...	...	...	...	1	15,587	3	0·1	1	958	2	2·0	1	923	1	1·0	3	17,468	6	0·3
August	...	...	...	...	...	...	...	...	1	387	1	2·5	1	15,587	11	0·7	7	14,228	36	2·5	5	3,208	12	3·7	24	33,410	60	1·7
September ...	...	...	...	...	...	...	...	...	2	3,476	9	2·5	1	15,587	18	1·1	17	24,963	140	5·6	14	20,524	73	3·5	34	64,570	240	3·7
October ...	...	...	...	...	...	...	...	...	4	1,684	7	4·1	1	15,587	19	1·2	9	16,491	54	3·2	11	21,134	67	3·1	25	54,896	147	2·6
November ...	4	3,042	6	1·9	1	21,670	175	8·0	27	34,811	61	1·7	1	15,587	45	2·8	41	49,838	312	6·2	31	40,948	171	4·1	105	165,896	770	4·6
December ...	...	...	...	...	...	21,670	181	8·3	22	24,233	106	4·3	1	15,587	43	2·6	23	30,282	98	3·2	36	36,541	159	4·3	83	128,313	587	4·5
Total ...	15	9,340	21	2·2	1	21,670	432	19·9	75	73,323	349	4·7	1	15,587	187	11·9	74	85,808	931	10·8	151	110,785	1,370	12·3	317	816,506	3,290	10·3

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380. In this district also there were two distinct waves of cholera mortality. In February and March, and again in July to November. The total registered deaths were 6,923. In the Municipal towns of Vizagapatam and Vizianagrum deaths occurred in every month of the year but May.

Vizagapatam.

381. In Bimlipatam deaths were registered in every month but January and May. In this district also the north-east monsoon failed, and water was scarce at the end of the year. Cholera seems to have prevailed in every division of the district except Srungavarapukota. It was most severe in Palcondah and the Municipal towns.

382. Out of 2,915 villages and towns in the whole district there were cholera deaths in 691.

Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Vizagapatam District during each Month of the Year 1877.

Taluqs	Sarvasidhi.				Narsipatam.				Ankapalli.				Vizagapatam.				M. T. Vizagapatam.				Viravilli.			
Population ...	107,816.				69,391.				93,860.				55,648.				31,462.				156,804.			
Total No. of Villages in each Circle.	155.				228.				194.				61.				1.				247.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	31,462	5	0·1	...	...	...	...
February	2	3,170	9	2·8	...	...	...	...	...	...	...	...	1	2,165	3	1·3	1	31,462	17	0·5	1	7,428	1	0·1
March	1	2,017	13	6·4	...	...	...	...	5	23,997	26	1·0	3	2,394	25	10·4	1	31,462	23	0·7	1	4,475	21	4·6
April	...	...	...	...	...	...	...	...	4	17,837	6	0·3	2	2,182	2	0·9	1	31,462	1	0·03	1	4,475	58	1·2
May	...	...	...	...	...	...	...	...	...	...	...	...	1	2,163	1	0·4	...	...	...	...	...	...	...	...
June	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	31,462	12	0·3	...	...	...	...
July	3	4,328	8	1·8	1	609	1	1·6	6	22,673	54	2·3	12	15,231	60	3·9	1	31,462	49	1·5	1	2,966	9	3·0
August	8	14,278	47	3·2	...	...	...	...	5	26,017	5	0·1	24	27,458	166	6·0	1	31,462	91	2·9	6	8,363	26	3·1
September	16	22,875	103	4·5	...	...	...	...	3	3,415	8	2·3	19	17,741	101	5·6	1	31,462	88	2·8	8	9,815	16	1·6
October	23	30,405	99	3·2	...	...	...	...	5	20,952	30	1·4	3	3,489	3	0·8	1	31,462	16	0·5	5	13,667	38	2·7
November	19	29,013	109	3·7	4	4,508	56	12·4	7	25,385	34	1·3	2	1,211	6	4·9	1	31,462	13	0·4	7	14,676	38	2·5
December	7	16,387	29	1·7	5	5,294	28	5·2	10	35,376	49	1·3	9	10,867	74	7·1	1	31,462	16	0·5	4	7,396	70	9·4
Total ...	51	70,498	417	5·9	8	6,618	85	12·8	31	65,820	212	3·2	46	48,390	441	9·1	1	31,462	381	10·5	21	40,562	277	6·8

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Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Visagapatam District during each Month of the Year 1877—(Continued).

Taluqs	Bimlipatam.				M. T. Bimlipatam.				Srungavarapukota.				Vizianagarum.				M. T. Vizianagarum.				Gajapathinagarum.			
Population ...	80,510.				8,601.				118,510.				112,581.				20,164.				111,874.			
Total No. of Villages in each Circle.	113.				1.				192.				153.				1.				218.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	20,164	17	0·8	2	2,744	3	1·0
February	2	1,934	6	3·1	1	8,601	8	0·9	...	...	...	...	16	22,769	49	2·1	1	20,164	50	2·4	23	27,500	142	5·1
March	10	13,584	54	3·9	1	8,601	3	0·3	...	...	...	...	21	21,401	108	5·0	1	20,164	23	1·1	25	35,066	167	4·7
April	6	7,431	9	1·2	1	8,601	2	0·2	...	...	...	...	14	14,474	27	1·8	1	20,164	49	2·4	1	2,697	1	0·3
May	...	...	...	...	...	...	...	...	...	...	...	...	1	2,252	4	1·7	...	...	...	..	1	688	10	14·5
June	6	9,333	26	2·7	1	8,601	1	0·1	...	...	...	...	4	4,139	35	8·4	1	20,164	2	0·09	1	2,355	2	0·8
July	18	22,816	73	3·1	1	8,601	10	1·1	...	...	...	...	7	5,979	34	5·6	1	20,164	35	1·7	6	7,961	11	1·3
August	27	44,097	83	1·8	1	8,601	15	1·7	...	...	...	...	3	2,715	10	3·6	1	20,164	26	1·2	4	4,738	12	2·5
September ...	15	24,714	88	3·5	1	8,601	5	0·5	...	...	...	...	13	17,565	46	2·6	1	20,164	21	1·04	9	12,766	49	3·8
October	12	17,419	83	4·7	1	8,601	24	2·7	...	...	...	...	20	22,058	86	3·8	1	20,164	20	0·9	10	11,049	38	3·4
November	13	23,168	157	6·7	1	8,601	2	0·2	...	...	...	...	11	13,691	55	4·0	1	20,164	16	0·7	16	19,229	77	4·0
December	8	13,033	48	3·6	1	8,601	6	0·7	...	...	...	...	10	13,959	60	4·2	1	20,164	70	3·4	7	9,824	25	2·5
Total ...	66	92,925	627	6·7	1	8,601	76	8·8	...	...	...	...	62	67,275	514	7·6	1	20,164	329	16·3	64	72,578	537	7·3

Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Vizagapatam District during each Month of the Year 1877—(Continued).

Taluqs	Chipurupalli.				Salur.				Bobbili.				Palacondah.				Parvatipore.				Total.			
Population ...	126,464.				57,240.				109,288.				173,218.				115,539.				1,548,470.			
Total No. of Villages in each Circle.	371.				217.				169.				341.				253.				2,915.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	...	...	...	...	2	4,074	6	1·4	1	428	7	16·3	5	8,698	10	1·1	...	...	...	...	12	67,570	48	0·7
February	...	...	...	...	6	16,499	38	2·3	19	38,415	106	2·7	27	38,952	227	5·8	2	1,500	7	4·6	102	220,559	663	3·00
March	15	12,358	88	7·1	9	19,882	74	3·7	19	42,227	84	1·9	29	41,515	130	3·1	14	21,120	81	3·8	155	300,218	920	3·06
April	7	7,243	29	4·0	6	20,472	17	0·8	6	5,967	15	2·5	13	17,929	115	6·4	9	22,646	20	0·8	72	183,580	351	1·9
May	1	1,018	1	0·9	...	...	...	...	...	...	...	...	3	5,819	10	1·7	2	2,026	5	2·4	9	13,966	31	2·2
June	...	...	...	...	...	...	...	...	...	...	...	...	8	9,774	112	11·4	...	...	...	...	22	85,828	190	2·2
July	1	2,323	1	0·4	11	22,046	32	1·4	7	16,378	26	0·9	25	23,614	103	4·3	...	...	...	...	101	207,151	506	2·4
August	1	1,451	3	2·0	15	23,961	79	3·2	11	20,859	31	1·4	7	7,900	35	4·4	7	18,585	12	0·6	121	260,649	641	2·4
September	6	4,740	65	13·7	8	20,159	83	4·1	11	30,683	102	3·3	31	35,305	85	2·4	2	1,364	3	2·1	139	261,369	863	3·3
October	3	7,430	34	4·5	5	18,857	62	3·2	9	15,372	52	3·3	34	36,954	180	4·8	27	45,103	83	1·8	159	302,982	848	2·8
November	16	20,755	58	2·4	4	19,059	17	0·8	13	33,420	80	2·3	40	63,244	250	3·9	11	27,750	87	3·1	166	355,366	1,055	2·9
December	12	15,625	103	6·5	2	10,796	8	0·7	5	7,900	13	1·6	50	47,592	186	3·9	6	12,368	22	1·7	138	266,144	807	3·03
Total ...	48	49,564	382	7·7	36	43,762	416	9·5	53	91,631	516	5·5	150	137,169	1,443	10·5	52	75,522	320	4·2	691	922,565	6,923	7·5

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383. This district appears to have been absolutely free of cholera in January, and in February only three deaths were returned. In March 23 deaths were registered, chiefly in zemindary estates. In June and July the disease had become general, and the mortality increased somewhat until November. All the Municipal towns suffered, and the disease continued in epidemic form at the end of the year. The total cholera deaths registered was 7,072, and these occurred in 694 towns and villages out of 2,128 of which the district is composed. There was a deficient rainfall at the end of the year, and the river did not rise to its accustomed height, showing deficient rainfall in the basin of the Godavery and its tributaries. This district exported grain to a very large extent throughout the famine period, and although prices rose very high, there is no evidence to show that the people were unable to get food and wages. No special relief-works were needed.

Godavery.

Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Godavery District during each Month of the Year 1877.

Taluqs	Ramachendrapuram.				Amalapuram.				Narasapuram.				Bhimavaram.			
Population	263,583.				206,885.				177,876.				92,457.			
Total No. of Villages in each Circle.	164.				172.				139.				148.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
February	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
March	...	...	...	...	...	...	...	...	1	1,586	1	0·6	...	...	...	...
April	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
May	...	...	...	...	...	...	...	...	2	6,331	4	0·6	3	3,675	5	1·3
June	2	3,251	11	3·3	...	...	...	...	2	3,021	2	0·6	6	6,760	27	3·9
July	16	29,425	132	4·4	11	17,029	25	1·4	16	33,289	69	2·0	22	16,016	137	8·5
August	34	56,906	162	2·8	12	14,240	47	3·3	26	59,152	81	1·3	37	35,255	152	4·3
September	18	33,796	159	4·7	13	21,776	42	1·9	18	39,163	68	1·7	13	13,996	61	4·3
October	33	59,136	142	2·4	23	32,314	101	3·1	19	40,614	93	2·2	15	18,755	67	3·5
November	37	61,587	232	3·7	42	70,378	195	2·7	39	77,518	166	2·1	17	20,757	63	3·0
December	20	36,139	182	5·0	16	29,771	92	3·0	13	27,219	50	1·8	8	7,342	53	7·2
Total ...	87	136,878	1,020	7·4	72	119,820	502	4·1	69	118,922	534	4·4	67	57,574	565	9·8

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Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Godavery District during each Month of the Year 1877—(Continued).

Taluqs	Tanaku.				Ellore.				M. T. Ellore.				Yernagudiem.				Rajahmundry.				M. T. Rajahmundry.			
Population	167,491.				111,388.				25,487.				145,715.				109,163.				19,738.			
Total No. of Villages in each Circle.	180.				247.				1.				214.				392.				1.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
February	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	19,738	3	0·1
March	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
April	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
May	4	3,351	17	5·0	11	13,936	68	4·8	1	25,487	15	0·5	4	5,615	61	10·8	...	...	...	...	...	...	...	...
June	4	3,602	39	10·7	7	10,286	58	5·6	1	25,487	1	0·3	3	4,842	5	1·1	5	10,711	53	4·9	1	19,738	9	0·4
July	16	15,815	71	4·4	28	21,807	123	5·6	1	25,487	30	1·1	3	1,908	22	11·5	5	11,343	28	2·4	1	19,738	13	0·6
August	20	25,376	107	4·1	29	26,288	124	4·7	1	25,487	76	2·9	7	7,617	12	1·5	8	11,763	58	4·8	1	19,738	57	2·8
September	9	12,949	40	3·0	2	538	2	3·7	1	25,487	18	0·7	4	3,107	29	9·3	5	13,060	20	1·5	1	19,738	25	1·2
October	12	17,098	34	1·9	3	2,132	5	2·3	1	25,487	71	2·7	4	3,663	8	2·1	16	21,840	55	2·4	1	19,738	128	6·4
November	27	42,367	172	4·0	1	1,327	2	1·4	1	25,487	6	0·2	7	9,518	20	2·1	15	25,856	147	5·7	1	19,738	43	2·1
December	16	20,153	77	3·7	10	15,109	72	4·7	1	25,487	46	1·7	6	7,011	33	4·7	9	13,234	44	3·3	...	...	...	...
Total ...	67	76,216	557	7·3	58	46,831	454	9·6	1	25,487	263	10·3	25	31,098	190	6·1	38	44,189	405	9·1	1	19,738	278	14·08

Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Godavery District during each Month of the Year 1877—(Continued).

Taluqs	Peddapur.				Badrachellum.				M. T. Cocanada.				Zemindaries.				Total.			
Population	111,489.				27,695.				17,839.				203,828.				1,620,634.			
Total No. of Villages in each Circle	212.				......				1.				257.				2,128.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
February	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	19,738	3	0·1
March	...	...	...	...	...	...	...	...	...	...	...	...	6	8,349	22	2·6	7	9,935	23	2·3
April	4	5,489	26	4·7	...	...	...	...	...	...	...	...	3	11,268	24	2·1	7	16,757	50	2·9
May	4	6,548	19	2·9	...	...	...	...	...	...	...	...	...	...	...	...	29	64,943	189	2·9
June	1	415	7	16·8	...	...	...	...	...	...	...	...	3	4,919	15	3·0	35	93,032	227	2·4
July	4	7,103	20	2·8	12	...	86	...	...	...	...	...	16	35,710	69	10·9	151	234,670	825	3·5
August	20	36,496	152	4·1	18	...	68	...	1	17,839	61	3·4	26	50,850	167	3·2	240	387,007	1,324	3·4
September	19	29,769	125	4·1	8	...	15	...	1	17,839	45	2·5	51	82,644	279	3·3	163	313,862	926	2·9
October	29	34,356	150	4·3	...	...	...	...	1	17,839	23	1·2	55	85,725	291	3·3	212	378,697	1,168	3·0
November	25	26,969	122	4·5	...	...	...	...	1	17,839	23	1·2	37	57,962	245	4·2	250	456,823	1,436	3·1
December	3	9,372	39	4·1	...	...	...	...	1	17,839	20	1·1	34	53,662	191	3·5	137	262,338	899	3·4
Total ...	65	68,598	660	9·6	32	...	169	...	1	17,839	172	9·6	111	153,048	1,303	8·5	694	916,238	7,072	7·7.

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Kistna.

384. The upland portions of this district suffered from drought and failure of crops, and in these parts of the district cholera prevailed most generally and caused the highest mortality. The epidemic prevailed for some months in every taluq of the district, but it is worthy of note that one of the Municipal towns, Guntoor, had no deaths. Bapatla, Palnad, Narasarowpet, Nundigama, and Vinkondah were the taluqs in which the highest mortality occurred; all these taluqs are above the irrigation works of the delta. The total mortality was 12,374, and deaths occurred in 981 out of the 2,141 towns and villages of the district. By the end of the year the epidemic appeared to be dying out, and had already ceased in Guntoor, Masulipatam, Nundigama, and Vinkondah. The disease was most generally prevalent in February and August.

Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Kistna District during each Month of the Year 1877.

Taluqs	Repalli.				Bapatla.				Guntoor.				M. T. Guntoor.				Palnad.			
Population ...	169,915.				143,559.				108,955.				17,984.				120,671.			
Total No. of Villages in each Circle.	173.				105.				144.				1.				156.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	14	19,246	67	3·4	49	87,566	486	5·5	14	18,955	102	5·3	...	...	...	...	5	10,840	78	7·1
February	10	17,963	89	4·9	34	76,450	191	2·4	30	47,952	135	2·8	...	...	...	...	42	72,282	638	8·8
March	18	30,814	59	1·9	23	59,945	84	1·4	22	36,497	104	2·8	...	...	...	...	53	79,592	688	8·6
April	7	9,719	18	1·8	9	21,382	26	1·2	14	36,823	52	1·4	...	...	...	...	23	39,989	179	4·4
May	1	1,709	5	2·8	1	982	1	1·0	2	1,481	8	5·4	...	...	...	...	13	17,106	142	8·3
June	5	9,171	16	1·7	1	1,948	5	2·5	1	421	1	2·3	...	...	...	...	3	1,631	6	3·6
July	13	25,501	68	2·6	3	3,215	4	1·2	5	7,696	9	1·1	...	...	...	...	5	7,337	21	2·8
August	49	81,085	289	3·5	43	103,213	434	4·2	11	17,710	42	2·3	...	...	...	...	18	21,971	122	5·5
September	35	56,799	182	3·2	25	77,187	207	2·6	11	14,908	37	2·4	...	...	...	...	26	33,590	262	7·8
October	6	11,009	18	1·6	10	37,466	24	0·6	1	1,538	12	7·7	...	...	...	...	7	10,408	28	2·6
November	4	10,597	44	4·1	3	8,373	12	1·4	...	...	...	...	...	...	...	...	...	...	...	...
December	3	7,945	25	3·1	5	15,065	9	0·5	2	1,742	2	1·1	...	...	...	...	7	5,099	22	4·3
Total ...	78	112,593	880	7·8	97	203,205	1,483	7·2	66	100,440	504	5·01	...	...	...	...	89	110,295	2,186	19·8

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Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Kistna District during each Month of the Year 1877—(Continued).

Taluqs	Narasarowpet.				Gudiwada.				Satanipalli.				Masulipatam.				M. T. Masulipatam.			
Population	120,619.				87,138.				101,725.				130,456.				36,015.			
Total No. of Villages in each Circle.	160.				246.				190.				198.				1.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	53	61,433	519	8·4	...	...	...	...	11	12,706	54	4·2	2	2,548	6	2·3	1	36,015	12	0·3
February	68	79,553	921	11·5	...	...	...	...	30	30,138	158	5·2	5	3,802	26	6·8	1	36,015	8	0·2
March	59	64,113	470	7·3	...	...	...	...	30	27,498	239	8·8	...	...	...	...	...	...	...	...
April	20	22,032	71	3·2	1	543	2	3·6	19	13,556	64	4·7	...	...	...	...	...	...	...	...
May	5	5,133	13	2·5	2	675	5	7·4	5	3,180	17	5·3	...	...	...	...	...	...	...	...
June	1	3,071	3	0·9	10	5,318	52	9·7	1	527	3	5·6	3	1,586	10	6·3	1	36,015	1	0·02
July	2	2,283	4	1·7	33	31,218	185	5·9	...	...	...	...	25	28,112	95	3·3	1	36,015	107	2·9
August	31	34,712	137	3·6	34	24,099	138	5·7	6	6,100	30	4·9	43	42,011	236	5·6	1	36,015	59	1·6
September	23	25,508	102	3·9	11	8,067	42	5·1	4	8,161	22	2·6	19	23,274	138	5·9	1	36,015	1	0·02
October	4	4,680	12	2·5	6	9,862	65	6·5	1	1,570	5	3·1	4	4,172	13	3·1	1	36,015	8	0·2
November	3	2,652	15	5·6	2	3,071	19	6·1	3	2,890	5	1·7	1	873	4	4·5	1	36,015	1	0·02
December	2	1,293	11	8·5	4	1,829	9	4·9	9	6,217	45	7·2	1	420	1	2·3	1	36,015	6	0·1
Total ...	116	116,447	2,278	19·5	70	50,547	517	10·2	71	60,419	632	10·4	74	110,827	529	4·7	1	36,015	203	5·6

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Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Kistna District during each Month of the Year 1877—(Continued).

Taluqs	Nundigama.				Bezwada.				Vinukondah.				Zemindaries.				Total.			
Population	106,610.				83,081.				64,509.				160,829.				1,452,066.			
Total No. of Villages in each Circle.	182.				129.				119.				347.				2,141.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	...	...	...	...	4	9,487	16	1·6	17	18,575	131	7·0	1	419	1	2·3	171	277,790	1,472	5·2
February	1	1,356	3	2·2	5	10,494	21	2·0	37	33,475	336	10·0	3	2,557	3	1·1	266	412,037	2,529	6·1
March	1	332	6	18·0	...	...	...	...	38	31,975	277	8·6	...	...	...	...	244	330,766	1,917	6·0
April	7	7,819	42	5·3	...	...	...	...	17	20,037	102	5·0	2	1,869	3	1·6	119	173,769	559	3·2
May	3	3,085	34	11·0	2	8,253	10	1·2	4	4,982	27	5·4	9	5,897	36	6·1	47	52,483	298	5·6
June	14	21,682	112	5·1	2	911	10	10·9	2	1,375	6	4·3	15	13,045	126	9·6	59	96,701	351	3·6
July	33	33,172	188	5·6	21	26,784	56	2·0	4	3,444	16	4·6	68	53,095	420	7·9	213	257,872	1,173	4·0
August	37	39,324	386	9·8	28	43,165	132	3·0	11	13,340	74	5·5	78	61,220	312	5·0	390	523,965	2,391	4·5
September	8	14,058	25	1·7	4	5,662	12	2·1	19	19,131	127	6·6	12	10,833	43	3·8	198	333,213	1,200	3·6
October	1	1,552	1	0·6	...	...	...	...	...	...	...	...	3	1,433	7	4·8	44	119,705	193	1·6
November	...	...	...	...	...	...	...	...	1	1,678	9	5·3	1	352	1	2·8	19	66,501	110	1·6
December	...	...	...	...	5	16,251	28	1·7	...	...	...	...	6	4,208	23	5·4	44	95,659	181	1·8
Total ...	67	60,191	797	13·2	33	38,780	285	7·3	72	57,197	1,105	19·3	147	107,777	975	9·04	981	1,164,733	12,374	10·6

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385. The total cholera mortality registered in this district was 19,476. Registration was very defective here for some months, so that the figures do not represent the real truth. The epidemic prevailed with great intensity in January and February, and then declined rapidly until August, when the mortality increased again especially in the northern portion of the district. While 8,816 deaths were registered in January, the number had declined to 59 in December. A great public work, the "Buckingham" Canal, to complete the water communication of the Godavery and Kistna Deltas with Madras and the Southern Districts, was carried on in this district all through the year, employing at one time from 50 to 60,000 laborers under the supervision of the Public Works Department. There was a good deal of cholera in January on the works, but under properly supervised sanitary arrangements the health of the laborers during the worst famine months was very fair. Efforts were made to send famine laborers from Bellary, Cuddapah, and Kurnool to these works, but with no great success, and many of the gangs *in transitu* were attacked and dispersed by cholera. Of 2,184 villages cholera prevailed in 822 in the month of January and in only 11 in December. Nellore was one of the districts that felt the effects of famine as early as October 1876. Many thousands of the sufferers in the southern part of the district wandered away into the town of Madras, and owing to the great extent of zemindary country in the district, where the laboring classes were allowed by the landlords to shift for themselves, the people suffered very severely from famine and disease during the early months of the year. The district received good general rain in the cyclone of May, which enabled agricultural work to be resumed, and afforded great relief to the ryots.

Nellore.

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Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Nellore District during each Month of the Year 1877.

Taluqs ...	Gudur.				Rapur.				Nellore.			
Population ...	144,971.				64,842.				150,772.			
Total No. of Villages in each Circe.	211.				158.				174.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January ...	80	69,514	956	13·7	78	44,933	742	16·5	96	114,517	845	7·3
February ...	64	57,395	328	5·7	39	26,116	289	11·0	58	71,238	288	4·0
March ...	7	3,641	31	8·5	18	18,447	126	6·8	16	16,656	93	5·5
April	4	7,053	12	1·7	9	10,140	35	3·4	9	11,481	21	1·8
May	2	1,710	4	2·3	6	8,253	22	2·6	11	12,783	78	6·1
June	27	32,586	88	2·6	2	797	5	6·2	3	4,236	9	2·1
July	21	18,349	47	2·5	...	...	...	...	8	6,181	20	3·2
August ...	12	15,141	23	1·8	2	3,001	28	9·3	27	30,184	113	3·7
September ...	11	13,829	42	3·0	3	2,431	14	5·7	16	26,073	67	2·5
October ...	4	1,335	15	11·2	3	2,087	12	5·7	5	9,753	22	2·2
November ...	...	...	...	..	3	2,595	31	11·9	3	1,643	5	3·0
December ...	1	956	13	13·5	...	...	...	...	...	...	...	...
Total ...	129	93,636	1,564	16·7	89	52,536	1,304	24·8	129	145,225	1,561	10·7

Taluqs ...	M. T. Nellore.				Atmakur.			
Population ...	29,698.				104,742.			
Total No. of Villages in each Circe.	1.				148.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January ...	1	29,698	82	2·7	62	62,236	720	11·5
February ...	1	29,698	106	3·6	36	41,213	237	5·7
March ...	1	29,698	29	0·9	21	27,835	153	5·5
April	1	29,698	25	0·8	12	17,099	37	2·1
May	1	29,698	13	0·4	7	13,939	26	1·8
June	1	29,698	1	0·03	2	870	9	10·3
July	...	...	...	...	2	1,024	5	4·8
August ...	1	29,698	117	3·9	1	218	5	22·9
September ...	1	29,698	50	1·6	5	4,683	17	3·6
October ...	1	29,698	6	0·2	...	...	...	...
November ...	...	...	...	...	1	632	14	22·1
December ...	...	...	...	...	...	...	...	...
Total ...	1	29,698	431	14·5	87	77,830	1,223	15·7

Taluqs ...	Kavali.				Udayagiri.			
Population ...	81,511.				100,743.			
Total No. of Villages in each Circe.	93.				164.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January ...	20	24,331	321	13·1	15	13,213	142	10·7
February ...	22	30,795	164	5·3	24	19,962	230	11·5
March ...	6	10,672	50	4·6	3	1,756	67	38·1
April	10	18,830	30	1·5	3	3,365	5	1·2
May	9	19,815	44	2·2	9	11,353	36	3·1
June	4	7,966	12	1·5	1	2,202	5	2·4
July	2	4,814	3	0·6	3	4,549	14	3·0
August ...	7	17,918	15	0·8	1	954	2	2·0
September ...	9	20,057	42	2·0	5	7,179	22	3·0
October ...	9	17,092	33	1·9	1	1,987	8	4·0
November ...	6	5,948	27	4·5	...	...	...	...
December ...	1	889	7	7·8	...	...	...	...
Total ...	36	44,825	748	16·7	40	36,579	531	14·5

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Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Nellore District during each Month of the Year 1877—(Continued).

Taluqs	Kundukur.				Kanigiri.				Ongole.				Zemindaries.				Total.			
Population	138,923.				124,689.				195,934.				239,658.				1,376,483.			
Total No. of Villages in each Circle.	232.				254.				198.				551.				2,184.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	52	56,176	425	7·5	42	37,522	665	17·5	33	1,10,199	931	8·4	299	201,686	2,987	14·8	822	764,025	8,816	11·6
February	40	44,388	284	6·0	32	28,103	323	11·4	64	91,124	499	5·2	210	164,287	2,054	12·5	590	604,389	4,804	7·9
March	5	9,806	48	4·8	5	3,531	59	16·7	38	49,388	226	4·5	112	83,162	674	8·1	232	251,095	1,556	6·1
April	3	2,616	7	2·6	6	10,230	24	2·3	12	24,710	40	1·6	65	68,104	309	4·5	134	208,326	545	2·6
May	4	4,119	5	1·2	1	368	1	2·7	1	2,581	1	0·3	31	32,322	135	4·1	82	136,941	365	2·6
June	1	1,089	15	13·7	...	...	...	...	...	...	...	...	21	22,142	74	3·3	62	101,586	218	2·1
July	1	759	1	1·3	3	3,800	14	3·6	2	2,561	24	9·3	21	20,855	94	4·5	63	62,892	222	3·5
August	3	3,665	3	0·8	11	12,003	69	5·7	32	59,856	263	4·3	59	46,259	489	10·5	156	218,847	1,132	5·1
September	19	26,259	68	2·5	9	11,026	62	5·6	30	64,869	421	6·4	72	63,788	497	7·7	180	269,892	1,302	4·8
October	5	5,365	9	1·6	7	8,342	48	5·7	7	31,506	33	1·0	19	18,399	94	5·1	61	125,866	280	2·2
November	1	896	4	4·4	7	7,744	60	7·7	4	14,726	17	1·1	4	1,657	19	11·4	29	35,840	177	4·9
December	5	4,441	20	4·5	2	1,097	16	14·5	2	4,266	3	7·0	...	...	...	...	11	11,649	59	5·0
Total ...	75	77,759	889	11·4	62	49,539	1,341	27·1	111	144,145	2,458	17·0	502	336,954	7,426	22·3	1,252	10,88,726	19,476	17·9

386. The total of registered cholera deaths in this district was 4,391, but as the laboring poor began early to wander away from their homes towards Madras and Conjeveram, it is probable that a great many deaths escaped registration. The highest number of cholera deaths were registered in January, but in July and August the southern taluq of Madranticum was severely affected, as was the neighboring district of South Arcot.

Chingleput.

387. Out of 2,394 villages, cholera deaths were registered in 493.

388. The northern part of the district received good rain in the cyclone of May, but prolonged drought through June and July prevented the people from resuming cultivation to the normal extent.

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Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Chingleput District during each Month of the Year 1877.

Taluqs	Sydapet.				Chingleput.				Madrantakam.				Conjeveram.			
Population	183,008.				132,271.				197,303.				130,695.			
Total No. of Villages in each Circle.	335.				440.				563.				460.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	10	16,463	356	21·6	21	18,554	131	7·0	26	19,519	148	7·1	19	20,993	111	5·2
February	7	12,605	89	7·0	18	12,790	92	7·1	16	9,003	102	11·3	14	11,102	40	3·6
March	8	12,867	22	1·7	10	12,399	42	3·3	11	10,517	41	3·8	24	19,158	84	4·3
April	4	5,482	14	2·5	5	6,020	9	1·4	20	19,935	56	2·7	13	11,645	32	2·7
May	6	6,639	35	5·2	8	13,356	46	3·4	49	40,405	190	4·7	6	4,324	9	2·0
June	5	4,716	18	3·7	18	23,165	60	2·5	25	12,684	53	4·1	8	6,877	10	1·4
July	17	14,407	55	3·7	22	18,249	88	4·8	102	68,162	495	7·2	7	12,748	59	4·6
August	18	18,559	51	2·7	13	14,558	104	7·1	72	34,938	314	8·9	7	13,691	50	3·6
September	3	4,615	14	3·0	6	12,569	25	1·9	27	27,019	95	3·5	...	...	...	...
October	...	...	...	...	2	2,957	4	1·3	13	7,970	45	5·6	...	...	...	...
November	2	835	7	8·3	...	...	...	...	1	220	1	4·5	...	...	...	...
December	1	513	4	7·7	...	...	...	...	5	3,167	21	6·6	...	...	...	...
Total ...	53	53,051	665	12·5	71	53,193	601	11·4	223	122,705	1,556	12·6	61	38,791	395	10·1

Taluqs	M. T. Conjeveram.				Trivellore.				Ponnery.				Total.			
Population	37,317.				149,774.				104,155.				934,523.			
Total No. of Villages in each Circle.	1.				339.				256.				2,394.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	1	37,317	278	7·4	15	17,631	64	3·6	26	25,165	192	7·6	118	155,642	1,275	8·1
February	1	37,317	26	0·6	4	2,206	24	1·0	8	11,287	40	3·5	68	96,812	413	4·2
March	1	37,317	34	0·8	2	2,023	3	1·4	7	4,223	40	9·4	63	98,504	266	2·7
April	1	37,317	17	0·4	3	3,310	5	1·5	8	1,891	21	11·1	54	85,600	154	1·7
May	1	37,317	11	0·2	12	19,532	36	1·8	3	619	6	9·6	85	122,192	333	2·7
June	1	37,317	45	1·2	1	644	3	4·6	7	12,503	25	1·1	65	97,906	214	2·1
July	1	37,317	192	5·1	2	1,235	4	3·2	5	4,685	7	1·4	156	96,803	900	9·2
August	1	37,317	64	1·7	...	...	...	...	5	1,251	8	6·3	116	120,814	591	4·9
September	1	37,317	9	0·2	...	...	...	...	...	...	...	...	37	81,520	143	1·7
October	1	37,317	9	0·2	...	...	...	...	...	...	...	...	16	48,244	58	1·2
November	1	37,317	2	0·05	1	1,127	3	2·6	...	...	...	...	5	49,509	13	1·2
December	1	37,317	1	0·02	1	1,847	1	0·5	1	441	4	9·0	9	43,285	31	0·7
Total ...	1	37,317	688	18·4	31	33,487	143	4·2	53	38,064	343	9·01	493	376,618	4,391	11·6

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389. The cholera mortality registered in the town of Madras was much greater than in any previous year of the last quarter of a century. At the end of December 1876 great numbers of people from Chingleput, Nellore, and North Arcot began to flock into the town. It was quite impossible to estimate the temporary increase of population for any one time, but for months together it is inferred from the overcrowding of houses and huts and the numbers without house accommodation that the ordinary population had increased by one-half; and that instead of 400,000 to deal with, we had about 600,000; the extra population all in extreme poverty. Cholera began to increase in the town in November and December 1876, and in January it reached its maximum of intensity. The total deaths during the year was 6,246, and of these 2,697 occurred in January and February. To meet the alarming condition of public health, the Madras Government was pleased to sanction a special health establishment and house-to-house visitation early in February. Cholera declined steadily until May, when there was a slight rise, and from that time until the end of the year, when in December only 34 deaths were returned.

Madras (Town).

390. In the large scattered area of the Municipal town there was considerable variation in the intensity of cholera, as will be seen from the following ratios of death to population:—

Divisions.	Population.	Cholera Deaths.	Ratio to Population.
1st Division	65,547	1,759	26·8
2nd do.	73,738	1,055	14·3
3rd do.	52,545	442	8·4
4th do.	9,791	150	15·3
5th do.	65,491	1,180	16·9
6th do.	19,390	75	3·8
7th do.	69,568	982	14·1
8th do.	41,482	679	16·3

391. The highest cholera mortality was in the 1st Division of the town, but this northern suburb was very crowded with immigrants from the mofussil, and the ratios above given are calculated only on the census population. The 6th Division of the town, which includes some scattered village areas such as Egmore, Kilpauk, and Nungumbaukum, where the European community reside, show a remarkably low cholera mortality. This no doubt is partly explained by the absence of famine wanderers in that division.

392. The facts as regards cholera in the town of Madras show almost a steady decline in mortality from January to December. There was a slight increase in May, due to local outbreaks. Throughout the early months of the year, or until the end of May, water-supply was bad; the Municipal water was full of living and dead matter, and offensive. In March and April public wells were cleared out. On 20th May and succeeding days 21 inches of rain fell in a storm of three days' duration. From this time there was no cause of anxiety in regard to water, and although it is usual in cholera epidemics for a rise of mortality to occur in July and August, the increase in 1877 was scarcely appreciable. The great decrease, moreover, in November and December showed clearly that the epidemic was at an end.

393. In the famine-relief camps at Monegar Choultry, Salt Cotaurs, and Chepauk there was scarcely any cholera, but several cases occurred in the camp at Tondiarpet. It was quite noticeable how little cholera affected the famine-stricken in camps, where sanitary regulations were attended to. A party of famine coolies who had recovered their strength sufficiently to work were moved out to a temporary camp in the Chepauk grounds to excavate the Junction Canal running through the grounds. Within three days of their removal cholera appeared amongst them, but on enquiry it turned out that cholera for some days previously had been very rife in the bazaars of Triplicane and fishing villages adjoining; and I never had any doubt that the famine coolies contracted the disease in the locality to which they had been moved. Great efforts were made to induce me to advocate the removal of the coolies, whose presence so near the public offices was held to be objectionable, but on consideration of the whole circumstances, I thought it safer to allow them to remain where they were encamped, and in a few days the choleraic tendency passed off, and the camp remained quite healthy so long as it existed.

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Table showing particulars of Cholera Deaths in the different Divisions of Madras (Town) District during each Month of the Year 1877.

Divisions	1st Division.				2nd Division.				3rd Division.			
Population	65,547.				73,738.				52,545.			
Total No. of Villages in each Circle.	5.				3.				3.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	5	65,547	542	8·2	3	73,738	181	2·4	2	33,648	141	4·1
February	5	65,547	251	3·8	3	73,738	176	2·3	2	33,659	88	2·6
March	5	65,547	146	2·2	3	73,738	164	2·2	2	33,650	48	1·4
April	5	65,547	117	1·7	3	73,738	55	0·7	1	32,062	41	1·2
May	5	65,547	161	2·4	3	73,738	161	2·1	1	32,062	42	1·3
June	5	65,547	72	1·1	3	73,738	117	1·5	1	32,062	21	0·6
July	5	65,547	144	2·1	3	73,738	67	0·9	1	32,062	23	0·7
August	5	65,547	149	2·2	3	73,738	·71	0·9	2	33,650	18	0·5
September	4	30,307	98	3·2	2	68,559	29	0·4	1	32,062	13	0·4
October	5	65,547	55	0·8	2	68,559	16	0·2	1	32,062	5	0·1
November	3	17,924	20	1·1	2	68,559	8	0·1	...	...	...	...
December	3	23,898	4	0·1	2	68,559	10	0·1	2	33,650	2	0·05
Average ...	5	65,547	1,759	26·8	3	73,738	1,055	14·3	3	52,545	442	8·4

Divisions	4th Division.				5th Division.				6th Division.			
Population	9,791.				65,491.				19,390.			
Total No. of Villages in each Circle.	3.				8.				4.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	2	9,150	89	4·2	8	6,5491	270	4·1	3	15,537	14	0·9
February	2	9,150	29	3·1	8	65,491	140	2·1	3	16,779	10	0·5
March	2	9,150	9	0·9	8	65,491	133	2·03	3	14,168	9	0·6
April	1	5,650	14	2·4	8	65,491	82	1·2	2	10,315	5	0·4
May	1	5,650	23	4·07	8	65,491	204	3·1	3	16,779	7	0·4
June	2	9,150	5	0·5	6	47,716	70	1·4	2	10,315	7	0·6
July	2	9,150	14	1·5	6	47,716	61	1·2	2	11,557	6	0·5
August	2	9,150	10	1·1	8	65,491	51	0·7	...	...	...	...
September	1	5,650	2	0·3	6	53,447	26	0·4	2	14,068	7	0·5
October	2	9,150	2	0·2	5	54,824	23	0·5	1	7,704	7	0·9
November	2	9,150	2	0·2	7	54,216	37	0·6	1	7,704	1	0·1
December	1	5,650	1	0·1	5	49,716	11	0·2	1	7,704	2	0·2
Average ...	3	9,791	150	15·3	8	65,491	1,108	16·9	4	19,390	75	3·8

Divisions	7th Division.				8th Division.				Total.			
Population	69,568.				41,482.				397,552.			
Total No. of Villages in each Circle.	5.				6.				37.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	5	69,568	289	4·1	6	41,482	122	2·9	34	374,161	1,596	4·2
February	5	69,568	292	4·2	5	40,319	113	2·8	33	374,242	1,099	2·9
March	5	69,568	65	0·9	6	41,482	51	1·2	34	372,794	626	1·6
April	5	69,568	85	1·2	4	33,073	53	1·6	29	355,444	449	1·2
May	5	69,568	144	2·07	6	41,482	89	2·1	32	370,317	831	2·2
June	4	57,511	41	0·7	5	40,319	40	0·9	28	336,358	373	1·1
July	4	66,522	23	0·3	4	35,126	105	2.9	27	341,418	443	1·2
August	5	69,568	20	0·2	4	35,126	65	1·8	29	352,270	384	1·7
September	4	56,522	8	0·1	4	40,319	30	0·7	24	300,934	213	0·7
October	4	57,511	11	0·1	3	31,023	6	0·1	23	316,880	125	0·4
November	3	51,424	4	0·07	1	5,255	1	0·1	19	214,232	73	0·3
December	...	...	...	...	2	25,880	4	0·1	16	215,007	34	0·1
Average ...	5	69,568	982	14·1	6	41,482	679	16·3	37	397,552	6,246	15·7

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394. The total cholera mortality registered in this district was 25,783. The epidemic prevailed in the beginning of the year, but attained its greatest intensity in July, August, and September.

South Arcot.

This district in the early months of the year was thought to be safe from famine, but deficient rain in the south-west monsoon spoiled the cumboo harvest, and in August and September the dry inland taluqs of the district were sorely distressed. In these taluqs, viz., Tindivanum, Kullacoorchy, Trikalore, and Trinomalai the cholera mortality was most severe, and there was a coincidence between the intensity of cholera and the setting in of general distress.

395. Out of 3,118 villages, cholera prevailed in 829 in August, the month of greatest prevalence.

Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the South Arcot District during each Month of the Year 1877.

Taluqs ...	Cuddalore.				M. T. Cuddalore.				Villapuram.			
Population ...	234,587.				39,940.				236,092.			
Total No. of Villages in each Circle.	257.				1.				328.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	38	68,785	233	3·3	1	39,940	15	0·3	26	31,979	92	2·8
February	38	54,032	176	3·2	...	...	...	...	37	56,212	148	2·6
March	28	45,823	132	2·8	...	...	...	...	31	34,048	120	3·5
April	14	22,051	84	3·8	...	...	...	...	34	25,921	112	4·3
May	10	22,520	81	3·5	...	...	...	...	37	44,900	172	3·8
June	9	18,083	31	1·7	...	...	...	...	45	55,162	206	3·7
July	40	60,572	166	2·7	1	39,940	36	0·9	39	95,947	589	6·1
August	79	111,967	412	3·6	1	39,940	71	1·8	123	117,512	785	6·6
September ...	70	84,781	420	4·9	1	39,940	13	0·3	78	92,199	479	5·1
October	24	53,518	123	2·2	1	39,940	2	0·5	55	102,615	260	2·5
November	39	68,578	207	3·0	1	39,940	21	0·5	59	76,991	401	5·2
December	77	121,603	496	4·0	1	39,940	62	1·5	73	89,280	536	6·0
Total ...	170	209,706	2,561	12·2	1	39,940	220	5·5	267	225,711	3,900	17·2

Taluqs ...	Chellumbrum.				M. T. Chellumbram.			
Population ...	223,605.				15,518.			
Total No. of Villages in each Circle.	492.				1.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	55	45,212	256	5·6	1	15,518	4	0·2
February	62	50,298	235	4·6	1	15,518	3	0·1
March	43	32,877	190	5·7	1	15,518	3	0·1
April	13	8,524	39	4·5	...	...	...	...
May	42	36,978	220	5·9	...	...	...	...
June	43	28,635	229	7·6	...	...	...	...
July	85	82,828	339	4·0	1	15,518	22	1·4
August	96	131,244	429	3·1	1	15,518	13	0·8
September ...	59	55,320	266	4·8	1	15,518	11	0·7
October	22	27,492	53	1·9	1	15,518	6	0·3
November	10	19,131	36	1·8	1	15,518	4	0·2
December	15	22,721	56	2·4	1	15,518	2	0·1
Total ...	271	166,631	2,348	14·09	1	15,518	68	4·3

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Table showing the particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the South Arcot District during each Month of the Year 1877—(Continued).

Taluqs	Tindevanam.				Kullacoorchy.				Trickalore.				Trinomalai.				Virdachellum.				Total.			
Population ...	239,688.				196,560.				216,238.				164,643.				178,503.				1,755,324.			
Total No. of Villages in each Circle.	547.				312.				383.				492.				305.				3,118.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	36	30,902	285	9·2	22	24,676	158	5·4	23	22,649	131	5·7	23	8,391	147	17·5	38	38,125	287	7·5	262	296,177	1,608	5·4
February	34	32,475	113	3·4	27	38,378	130	3·3	35	44,937	152	3·3	22	11,810	118	9·9	39	46,751	174	3·7	295	350,411	1,249	3·5
March	72	52,316	291	5·5	33	35,361	202	5·7	50	47,297	302	6·3	43	29,027	329	11·3	47	47,465	201	4·2	348	339,732	1,770	5·2
April	58	40,053	224	5·5	37	33,399	263	7·8	40	35,823	178	4·9	55	34,210	302	8·8	24	17,840	87	4·8	275	217,821	1,289	5·9
May	100	74,375	496	6·6	40	43,316	261	6·0	49	44,241	289	6·5	103	53,059	625	11·7	26	23,821	115	4·8	407	343,205	2,259	6·5
June	67	53,697	274	5·1	50	44,766	297	6·6	60	53,625	280	5·2	71	38,242	373	9·7	20	24,908	48	1·9	365	317,118	1,738	5·4
July	150	106,459	923	8·6	63	59,640	432	7·2	80	71,586	443	6·1	52	30,172	349	11·5	58	60,682	330	5·4	619	623,339	3,629	5·8
August	178	112,752	1,096	9·7	95	85,156	742	8·7	125	110,176	754	6·8	59	32,926	279	8·4	72	62,350	366	5·8	829	822,541	4,947	6·0
September ...	117	85,663	487	5·6	84	72,773	775	10·6	59	57,923	280	4·8	73	34,976	382	10·9	54	35,662	257	7·2	596	574,755	3,370	5·8
October	47	38,784	175	4·5	41	32,178	200	6·2	20	19,059	102	5·3	15	5,343	60	11·2	20	15,785	74	4·6	246	350,232	1,055	3·0
November ...	36	21,629	117	5·4	31	22,565	169	7·4	25	19,487	197	10·1	13	6,432	56	8·7	6	8,161	12	1·4	221	298,427	1,220	4·0
December ...	47	38,211	179	4·6	21	15,148	105	6·9	27	24,337	91	3·7	9	4,564	63	13·8	14	15,795	59	3·7	285	387,117	1,649	4·2
Total ...	398	21,261	4,660	21·9	211	156,944	3,734	23·9	260	188,901	3,199	17·3	271	110,098	3,083	28·0	194	140,025	2,010	14·3	2,044	1,461,154	25,783	17·6

396. In this district the total mortality from cholera was 15,447. The epidemic was, as usual, fatal in January, declined in the following month of February, and, contrary to ordinary precedent, began to increase again in March, April, and May, and continued to prevail rather severely until October. Trichinopoly in itself would not have been a famine district, but it was overrun with wanderers from Salem and Coimbatore, and there was much distress amongst the poorer classes of its dense population. Cholera was not absent from the Municipal town for one month out of the year.

Trichinopoly.

397. Out of 1,674 villages, cholera deaths were registered in 1,163.

Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Trichinopoly District during each Month of the Year 1877.

Taluqs	Trichinopoly.				M. T. Trichinopoly.				M. T. Sreerungum.				Museri.			
Population	218,643.				75,306.				11,271.				257,173.			
Total No. of Villages in each Circle.	452.				1.				1.				234.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	163	120,722	567	4·6	1	75,306	152	3·8	1	11,271	61	5·4	52	67,400	540	8·0
February	41	33,745	90	2·6	1	75,306	17	2·8	1	11,271	1	0·08	26	40,424	98	2·4
March	31	31,200	121	3·8	1	75,306	11	5·2	...	...	...	...	27	48,454	161	3·3
April	24	29,254	73	2·4	1	75,306	1	3·5	...	...	...	...	27	53,238	187	3·5
May	62	55,018	252	4·5	1	75,306	10	3·6	1	11,271	2	0·1	72	118,469	474	4·0
June	69	57,807	165	2·8	1	75,306	59	6·4	1	11,271	3	0·2	61	90,182	293	3·2
July	74	65,048	269	4·1	1	75,306	49	3·9	1	11,271	8	0·7	58	84,807	349	4·1
August	74	72,725	254	3·4	1	75,306	63	5·6	1	11,271	8	0·7	81	111,963	529	4·7
September	81	71,063	217	3·0	1	75,306	26	5·0	1	11,271	6	0·5	84	110,770	612	5·5
October	44	41,311	81	1·9	1	75,306	17	4·7	1	11,271	13	1·1	48	63,697	263	4·1
November	42	41,727	74	1·7	1	75,306	15	3·9	1	11,271	1	0·08	35	52,737	141	2·6
December	38	25,169	98	3·8	1	75,306	14	...	1	11,271	6	0·5	17	20,680	49	2·3
Total ...	291	198,279	2,261	11·4	1	75,306	434	5·7	1	11,271	109	9·6	218	264,017	3,696	13·9

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Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Trichinopoly District during each Month of the Year 1877—(Continued).

Taluqs	Kulitalai.				Perambalur.				Udayarpoliem.				Total.			
Population	228,304.				170,563.				237,893.				1,199,155.			
Total No. of Villages in each Circle.	249.				248.				489.				1,674.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	76	113,062	803	7·1	20	28,325	80	3·8	28	29,723	171	5·7	341	445,809	2,374	5·3
February	42	64,404	209	3·2	13	15,924	83	5·2	30	25,779	121	4·6	154	266,853	619	2·3
March	40	64,857	186	2·8	14	10,829	93	8·5	53	51,245	421	8·2	167	293,162	993	3·3
April	35	51,992	249	4·7	39	43,066	374	8·6	60	45,961	286	6·2	187	312,063	1,170	3·7
May	66	105,634	543	5·1	48	41,816	269	6·4	75	72,357	600	8·2	325	479,871	2,150	4·4
June	49	80,727	183	2·2	26	31,866	102	3·9	66	53,791	334	6·2	278	410,950	1,139	2·7
July	53	80,819	320	3·9	34	38,644	219	5·6	65	51,126	382	7·4	286	407,026	1,596	3·6
August	64	106,852	495	4·6	30	38,635	196	5·0	67	53,400	413	7·7	318	470,171	1,958	4·1
September	49	80,331	508	6·3	52	69,986	332	4·7	71	58,892	375	6·3	339	477,569	2,076	4·3
October	17	36,400	67	1·8	38	47,614	187	3·9	14	17,494	28	1·6	163	293,093	656	2·2
November	11	23,036	54	2·3	13	24,102	94	3·9	3	2,029	4	1·9	106	230,208	383	1·6
December	19	50,994	95	1·8	7	15,880	56	3·5	6	4,491	15	3·3	89	208,741	333	1·6
Total ...	182	243,260	3,712	15·2	174	174,221	2,085	11·9	296	189,386	3,150	16·6	1,163	1,155,740	15,447	13·3

398. This thickly-populated district suffered from cholera in common with all the Southern Districts. The epidemic was active in January, declined in February, March, and April, and increased again in May, June, and July. There was another slight increase in December also. The total deaths registered were 13,098.

Tanjore.

399. The greatest prevalence was in the Tanjore, Combaconum, and Puttacottah Taluqs. Out of 3,967 villages, cholera prevailed in 1,497.

400. Tanjore, as regards its own population, was not in any distress beyond that arising from increased value of food. In the early part of the year the district had much grain to sell, and the high prices no doubt tempted many proprietors to sell closely; but with good seaports, importation of food-grains was very active all through the worst months of the famine.

401. The district received many distressed poor from other districts. Its permanent charities for feeding travellers are considerable, and the scarcity of food caused them to be largely resorted to.

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Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Tanjore District during each Month of the Year 1877.

Taluqs	Tanjore.				M. T. Tanjore.				Combaconum.				M. T. Combaconum.				Mayaveram.			
Population	292,114.				52,014.				296,587.				44,395.				198,048.			
Total No. of Villages in each Circle.	505.				1.				549.				1.				350.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	131	138,558	875	6·3	1	52,014	275	5·2	71	86,495	684	7·9	1	44,395	22	0·4	11	10,412	44	4·2
February	44	74,088	172	2·3	1	52,014	40	0·7	44	37,737	143	3·7	...	...	...	...	22	22,157	60	2·7
March	35	36,985	161	4·3	1	52,014	15	0·2	57	47,893	263	5·4	1	44,395	7	0·1	11	5,979	32	5·3
April	16	25,587	80	3·1	...	...	...	...	27	23,915	130	5·4	1	44,395	6	0·1	19	27,932	59	2·1
May	32	46,320	178	3·8	1	52,014	32	0·6	23	24,912	183	7·3	...	...	...	...	8	7,707	38	4·9
June	35	44,563	204	4·5	1	52,014	28	0·5	61	[illegible],553	208	3·8	1	44,395	111	2·5	31	24,117	107	4·4
July	37	62,158	196	3·1	1	52,014	27	0·5	49	47,823	213	4·4	1	44,395	64	1·4	22	12,480	84	6·7
August	52	77,822	305	3·8	1	52,014	32	0·6	39	48,744	95	1·9	1	44,395	18	0·4	12	19,068	51	2·6
September	53	39,714	227	5·7	1	52,014	35	0·6	26	22,191	64	2·8	...	...	...	...	16	16,473	67	4·0
October	20	25,498	88	3·4	1	52,014	5	0·09	20	19,848	49	2·4	1	44,395	6	0·1	9	8,722	23	2·6
November	17	16,586	38	2·2	1	52,014	2	0·03	6	6,812	33	4·8	...	...	...	...	7	8,260	35	4·2
December	19	31,575	64	2·0	1	52,014	6	0·1	27	32,599	83	2·5	1	44,395	23	0·4	29	34,059	181	5·3
Total ...	217	208,519	2,588	12·4	1	52,014	497	9·5	246	197·091	2,148	10·9	1	44,395	257	5·8	126	97,125	781	8·0

Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Tanjore District during each Month of the Year 1877—(Continued).

Taluqs	M. T. Mayavaram.				Shealy.				Nannilum.				Negapatam.				M. T. Negapatam.			
Population	21,160.				107,458.				207,405.				152,201.				48,075.			
Total No. of Villages in each Circle.	1.				210.				422.				345.				1.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	1	21,160	1	0·04	17	20,807	78	3·7	86	79,477	335	4·2	15	25,611	31	1·2	1	48,075	130	2·7
February	1	21,160	5	0·2	19	19,749	40	2·0	66	46,509	150	3·2	14	22,881	35	1·4	1	48,075	30	0·6
March	1	21,160	1	0·04	4	2,953	13	4·4	21	15,826	92	5·8	13	21,869	34	1·5	1	48,075	12	0·2
April	...	...	...	...	1	733	2	2·7	7	23,237	11	0·4	3	3,708	9	2·4	1	48,075	18	0·3
May	...	...	...	...	1	400	3	7·5	17	11,527	60	5·2	35	41,986	178	4·2	1	48,075	42	0·8
June	1	21,160	2	0·08	3	1,321	20	15·1	71	51,155	232	4·5	47	45,976	167	3·6	1	48,075	56	1·1
July	1	21,160	5	0·2	16	13,388	58	4·3	63	51,084	138	2·7	28	30,130	70	2·3	1	48,075	59	1·2
August	1	21,160	3	0·1	13	12,472	43	3·4	21	22,296	50	2·2	29	41,453	159	3·8	1	48,075	59	1·2
September	1	21,160	3	0·1	14	17,079	45	2·6	18	8,124	34	4·1	24	31,097	56	1·8	1	48,075	24	0·4
October	1	21,160	2	0·08	2	4,796	12	2·5	4	3,182	8	2·5	7	8,410	4	0·4	1	48,075	9	0·1
November	1	21,160	2	0·08	1	4,057	2	0·4	3	2,772	7	2·5	1	203	2	9·8	1	48,075	1	0·02
December	1	21,160	2	0·08	8	14,030	25	1·7	12	8,751	32	3·6	2	5,148	3	0·5	1	48,075	4	0·08
Total ...	1	21,160	26	1·2	62	59,450	341	5·7	216	153,503	1,149	7·5	105	94,057	748	7·9	1	48,075	444	9·2

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Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Tanjore District during each Month of the Year 1877—(Continued).

Taluqs	Mannargoody.				M. T. Mannargoody.				Tritrapoondy.				Puttucottah.				Total.			
Population	143,561.				17,682.				154,714.				237,406.				1,972,820.			
Total No. of Villages in each Circle.	33.				1.				246.				1,004.				3,967.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	41	51,586	364	7·0	1	17,682	25	1·4	12	7,752	30	3·8	18	15,177	88	5·7	407	619,201	2,982	4·8
February	31	25,008	95	3·7	1	17,682	19	1·0	5	5,546	12	2·1	21	13,561	104	7·6	270	407,167	905	2·2
March	10	8,392	10	1·1	1	17,682	8	0·1	6	5,277	21	3·9	27	28,040	91	3·2	189	356,040	755	2·1
April	7	6,713	16	2·3	1	17,682	7	0·3	7	7,168	25	3·4	44	22,911	124	5·4	134	253,051	487	1·9
May	31	28,884	150	5·1	1	17,682	9	0·5	21	13,410	107	7·9	28	12,322	136	11·0	199	305,189	1,116	3·6
June	41	27,902	136	4·8	1	17,682	13	0·7	33	24,926	178	7·1	39	54,652	323	5·9	366	508,491	1,785	3·5
July	34	31,107	101	3·2	1	17,682	10	0·5	42	32,796	189	5·7	90	57,885	418	7·2	386	522,174	1,632	3·1
August	17	16,035	36	2·2	1	17,682	6	0·3	28	32,557	82	2·5	85	63,895	337	5·2	301	517,690	1,276	2·4
September	25	21,520	50	2·3	1	17,682	31	1·7	30	26,987	97	3·5	66	36,400	308	8·1	271	358,466	1,041	2·8
October	7	6,714	35	5·2	1	17,682	1	0·05	15	19,537	42	2·1	21	17,024	96	5·6	110	297,057	380	1·2
November	6	4,778	12	2·5	1	17,682	1	0·05	8	6,927	28	4·0	11	10,698	31	2·8	64	200,024	194	0·9
December	10	11,935	52	4·3	...	...	...	...	10	8,622	27	3·1	11	7,760	43	5·5	132	320,123	545	1·7
Total ...	146	101,120	1,057	10·4	1	17,682	125	7·1	118	91,895	838	9·1	256	170,834	2,099	12·2	1,497	1,856,920	13,098	9·6

402. The returns for this district do not include the populations of the large zemindaries of Ramnad and Shivagunga. The total cholera deaths registered were 15,647. The epidemic prevailed all through the year in one or other part of the district.

Madura.

403. In the Palni Taluq, for instance, there were 1,277 deaths in January and only 9 in December, while in the Madura Taluq there were only 13 deaths in January and 464 in May. In the Municipal town of Madura deaths occurred from cholera in every month of the year.

404. In Dindigul no cholera deaths were registered in February, March and April. This district, especially the drier parts of it, suffered greatly from famine distress, intensified by the subsequent destruction of dry grains by insects and blight. Violent floods prevailed towards the end of the year, doing further damage to dry crops.

405. At the end of the year cholera mortality was diminishing in the district, and there were indications of the dying out of the epidemic. The overcrowded jail population of Madura suffered very severely from cholera.

Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Madura District during each Month of the Year 1877.

Taluqs	Madura.				M. T. Madura.				Meylur.				Tirumangalam.			
Population	179,423.				51,806.				128,979.				241,209.			
Total No. of Villages in each Circle.	439.				1.				94.				259.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	2	8,433	13	1·5	1	51,806	6	0·1	6	13,897	40	2·8	12	22,795	31	1·3
February	7	14,733	38	2·5	1	51,806	3	0·05	21	50,219	211	4·2	31	50,479	122	2·4
March	12	14,307	127	8·8	1	51,806	39	0·7	22	50,048	246	4·9	46	70,591	288	3·9
April	54	56,351	244	4·3	1	51,806	117	2·2	18	41,396	74	1·7	62	85,536	355	4·1
May	54	56,295	464	8·2	1	51,806	76	1·4	37	66,664	619	9·2	78	128,418	432	3·4
June	20	19,880	71	3·5	1	51,806	35	0·6	17	33,243	115	3·4	38	61,361	102	1·6
July	24	29,538	268	9·0	1	51,806	21	0·4	27	49,751	265	5·3	39	47,506	139	2·9
August	19	25,310	359	14·1	1	51,806	174	3·3	22	40,849	187	4·5	51	77,854	321	4·1
September	21	23,857	206	8·6	1	51,806	92	1·7	14	29,810	84	2·8	59	98,823	340	3·4
October	4	4,415	58	13·1	1	51,806	93	1·7	6	15,873	22	1·3	34	46,184	195	4·2
November	5	6,435	52	8·0	1	51,806	76	1·4	3	9,945	18	1·8	25	39,216	129	3·2
December	4	4,752	11	2·3	1	51,806	51	0·9	3	13,992	23	1·6	12	15,899	16	1·0
Total ...	119	104,290	1,911	18·3	1	51,806	783	15·1	71	115,327	1,904	16·5	173	232,565	2,470	10·6

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Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Madura District during each Month of the Year 1877—(Continued).

Taluqs	Periacolum.				Dindigul.				M. T. Dindigul.				Palni.				Sittanandal Villages.				Total.			
Population	217,413.				311,498.				12,811.				184,818.				...				1,827,899.			
Total No. of Villages in each Circle.	82.				217.				1.				131.				...				1,224.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	...	...	...	...	44	122,357	310	2·5	1	12,811	3	0·2	63	123,428	1,277	10·3	...	...	...	...	129	358,577	1,680	4·7
February	10	46,192	59	1·2	32	77,058	201	2·6	...	...	...	...	35	63,048	280	4·5	...	...	...	...	137	352,530	914	2·5
March	10	52,339	115	2·1	32	62,377	236	3·7	...	...	...	...	7	13,451	18	1·3	...	...	...	...	130	314,919	1,069	3·3
April	17	76,920	82	1·0	49	88,613	181	2·0	...	...	...	...	5	6,281	22	3·5	...	...	...	...	206	406,843	1,075	2·6
May	27	109,002	284	2·6	63	142,326	518	3·6	1	12,811	15	1·1	16	31,709	111	3·5	...	...	...	...	277	854,026	2,519	2·8
June	41	143,502	710	4·9	58	128,355	390	3·0	1	12,811	20	1·5	17	35,637	210	5·8	1	1,255	1	0·7	194	487,865	1,654	3·3
July	22	82,464	177	2·1	52	107,650	247	2·2	1	12,811	8	0·6	17	38,303	250	6·5	1	134	4	2·9	184	419,855	1,379	3·2
August	20	68,684	217	3·1	78	163,772	593	3·6	1	12,811	35	2·7	30	48,200	405	8·4	1	438	1	2·2	223	489,324	2,292	4·6
September	20	101,723	114	1·1	73	165,529	570	3·4	1	12,811	74	5·7	33	61,547	322	5·2	2	...	2	...	224	445,906	1,804	3·3
October	13	41,642	57	1·3	19	49,964	66	1·3	1	12,811	3	0·2	5	6,612	45	6·8	...	...	...	...	83	229,307	539	2·3
November	12	26,513	57	2·1	20	30,691	125	4·0	1	12,811	7	0·5	3	1,363	2	1·2	...	...	...	...	70	178,780	466	2·6
December	5	27,635	16	0·5	17	42,175	128	3·0	1	12,811	2	0·1	6	31,595	9	0·2	...	...	...	...	49	200,465	256	1·2
Total ...	58	202,398	1,888	9·3	165	308,959	3,565	11·5	1	12,811	167	13·0	90	155,828	2,951	18·9	...	...	8	...	678	1,183,984	15,647	13·1

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406. The deaths registered from cholera in this district numbered 14,214. The epidemic prevailed very generally throughout the year, and the mortality was highest in March and April, and again in August and September. The epidemic was most severe in Ottapidaram, Tenkarai, Nunguneri, Strivilliputtur and Satur Taluqs. In these taluqs there was a good deal of distress, and many thousands of the male population emigrated to Ceylon.

Tinnevelly.

407. In the Municipal town of Tuticorin there was a large mortality from cholera, especially amongst the people assembling there on account of the grain traffic, and for emigration to Ceylon. In the last month of the year there was a renewal of the epidemic to some extent, and deaths were reported from 131 villages. The district was visited in December by two storms in which an unusual quantity of rain fell, doing immense damage to the tanks and irrigation channels. The famine distress and Government relief operations had ended before December.

Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Tinnevelly District during each Month of the Year 1877.

Taluqs ...	Ottapidaram.				M. T. Tuticorin.			
Population ...	285,802.				10,475.			
Total No. of Villages in each Circle.	427.				1.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January ...	32	34,066	122	3·5	1	10,475	77	7·3
February ...	30	41,729	155	3·7	1	10,475	106	10·1
March ...	35	46,614	144	3·0	1	10,475	36	3·4
April ...	32	39,389	115	2·8	1	10,475	67	6·3
May ...	31	43,709	97	2·2	1	10,475	68	6·4
June ...	39	93,219	279	2·9	1	10,475	70	6·6
July ...	75	80,881	283	2·8	1	10,475	28	2·6
August ...	88	99,823	260	2·6	1	10,475	119	11·3
September ...	66	85,137	314	3·6	1	10,475	80	7·6
October ...	42	52,388	142	2·7	1	10,475	3	0·2
November ...	8	13,720	23	1·6	...	...	...	...
December ...	13	22,728	25	1·0	1	10,475	1	0·09
Total ...	196	195,025	1,909	9·8	1	10,475	655	62·5

Taluqs ...	Tenkarai.				Tinnevelly.			
Population ...	234,312.				145,107.			
Total No. of Villages in each Circle.	172.				266.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January ...	13	41,826	42	1·0	11	22,504	30	1·3
February ...	13	39,875	88	2·2	14	43,530	42	0·9
March ...	63	155,291	830	5·3	23	40,026	77	1·9
April ...	62	164,318	1,237	7·5	13	38,146	22	0·5
May ...	40	111,398	196	1·7	15	44,923	37	0·8
June ...	41	123,197	234	1·8	4	4,867	7	1·4
July ...	28	79,814	102	1·2	17	39,268	33	0·9
August ...	32	71,199	119	1·6	28	62,353	89	1·4
September ...	23	60,829	80	1·3	14	37,236	36	0·9
October ...	21	63,531	45	0·6	13	29,892	23	0·7
November ...	24	120,755	111	0·9	7	32,248	11	0·3
December ...	42	113,990	170	1·4	11	27,469	84	1·2
Total ...	109	244,964	3,254	13·2	62	109,606	446	4·1

Taluqs ...	M. T. Tinnevelly.				M. T. Palamcottah.			
Population ...	21,044.				17,785.			
Total No. of Villages in each Circle.	1.				1.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January ...	1	21,044	7	0·3	1	17,785	4	0·2
February ...	1	21,044	81	3·8	1	17,785	7	0·3
March ...	1	21,044	37	1·7	1	17,785	11	0·6
April ...	1	21,044	13	0·6	...	...	...	...
May ...	1	21,044	4	0·1	...	...	...	...
June ...	...	...	...	...	1	17,785	1	0·05
July ...	1	21,044	7	0·3	...	...	...	...
August ...	1	21,044	15	0·7	1	17,785	28	1·5
September ...	1	21,044	5	0·2	1	17,785	8	0·4
October ...	1	21,044	2	0·09	1	17,785	5	0·2
November ...	...	...	...	...	1	17,785	8	0·4
December ...	1	21,044	9	0·4	1	17,785	14	0·7
Total ...	1	21,044	180	8·5	1	17,785	86	4·8

Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Tinnevelly District during each Month of the Year 1877—(Continued).

Taluqs	Strivilliputtur.				Sankaranainarcovil.				Nunguneri.				Ambasamudrum.			
Population ...	176,944.				182,018.				178,074.				163,215.			
Total No. of Villages in each Circle.	154.				112.				237.				140.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	14	64,935	99	1·5	20	71,047	127	1·7	55	111,274	313	1·9	36	88,934	107	1·2
February ...	43	118,499	279	2·3	38	107,504	207	1·9	17	49,038	56	1·1	7	20,654	17	0·8
March	51	135,650	543	4·0	41	118,263	236	1·9	37	78,607	243	3·0	10	36,303	42	1·1
April	39	94,817	188	1·9	19	63,566	66	1·0	54	92,053	382	4·1	8	17,703	26	1·4
May	30	96,111	133	1·3	35	94,725	161	1·7	32	50,817	158	3·1	7	23,457	13	0·5
June	8	27,310	52	1·9	15	44,322	32	0·7	21	38,164	95	2·4	7	23,832	23	0·9
July	4	4,908	8	1·6	20	53,026	87	1·6	48	72,349	248	3·4	12	45,305	25	0·5
August	23	58,789	141	2·3	40	115,405	196	1·6	43	59,015	204	3·4	18	53,807	69	1·2
September ...	26	75,329	139	1·8	44	127,459	203	1·5	50	80,947	246	3·0	30	68,012	153	2·2
October	17	49,894	34	0·6	33	103,476	188	1·8	21	28,902	48	1·6	15	36,840	34	0·9
November ...	11	29,897	44	1·4	27	97,132	124	1·2	2	1,722	6	3·4	1	6,523	1	0·1
December ...	5	2,906	18	6·1	15	62,969	53	0·8	15	26,572	138	5·1	13	38,181	43	1·1
Total ...	89	173,850	1,678	9·6	90	183,434	1,680	9·1	205	276,263	2,137	7·3	66	136,934	553	4·0

Taluqs	Sattur.				Tenkasi.				Total.			
Population ...	156,855.				121,998.				1,693,629.			
Total No. of Villages in each Circle.	208.				130.				1,849.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	36	49,052	181	3·6	21	48,481	179	3·6	241	581,428	1,288	2·2
February ...	53	70,733	215	3·0	14	29,580	57	1·9	232	569,946	1,310	2·2
March	45	63,171	206	3·2	19	36,846	62	1·6	327	620,065	2,467	3·9
April	24	29,280	80	2·7	6	22,943	16	0·6	259	593,684	2,212	3·7
May	27	37,683	74	1·1	14	36,150	76	2·7	233	564,492	1,017	1·8
June	25	28,344	55	1·9	2	3,673	6	1·6	214	415,188	854	2·0
July	17	13,495	48	3·5	8	24,185	68	2·7	231	443,895	892	2·0
August	35	43,951	88	1·9	10	19,082	17	8·9	320	632,728	1,345	2·1
September ...	25	37,381	46	1·2	12	18,164	33	1·8	293	639,698	1,343	2·0
October	8	15,140	11	0·7	12	17,206	32	1·8	185	446,573	567	1·2
November ...	3	3,796	4	1·0	6	8,697	19	2·1	90	382,282	351	1·0
December ...	3	8,429	7	0·8	11	41,142	56	1·3	131	393,630	568	1·4
Total ...	126	125,646	1,015	8·1	59	117,008	621	5·3	1,005	1,612,034	14,214	8·8

408. The district of Kurnool on the whole was one of the worst of the famine tracts. The food distress began here early, and the greatest cholera mortality occurred amongst the crowds on relief-works in the month of December 1876. In this month more than 6,000 deaths were registered from cholera. In January 1877 the cholera deaths had fallen to 1,989. In August the mortality had fallen to 747, and from this month cholera rather suddenly disappeared, and in November and December not a single death was registered from this cause in the whole district. Here, again, it will be noted that the intensity of cholera was synchronous with the early indications of famine and the unsettled conditions of the people who had been suddenly thrown out of work by failure of the rains in 1876. Cholera steadily declined in 1877, notwithstanding the increasing distress and debility of the people from want of food. The total deaths registered in the district was 10,451, and all these, with the exception of 53 in September and October, occurred from January to August.

Kurnool.

409. In the month of March cholera prevailed in 243 out of 787 villages of the district.

Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Kurnool District during each Month of the Year 1877.

Taluqs	Ramulcottah.				M. T. Kurnool.				Pattikondah.				Nandikotkur.				Nundial.			
Population	120,611.				25,462.				178,424.				101,863.				107,294.			
Total No. of Villages in each Circle.	108.				1.				110.				101.				92.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	16	23,571	124	5·2	1	25,462	21	0·8	17	35,291	401	11·3	14	23,506	153	6·5	9	19,058	56	2·9
February	10	13,673	34	2·4	1	25,462	6	0·2	11	26,886	117	4·4	3	5,680	11	1·9	10	23,098	46	1·9
March	22	34,678	119	3·4	1	25,462	44	1·3	41	70,431	316	4·4	30	39,119	140	3·5	28	41,484	241	5·8
April	16	28,351	77	2·7	1	25,462	57	2·2	19	34,680	139	4·0	39	49,087	290	5·9	25	35,923	323	8·8
May	17	25,378	83	3·2	1	25,462	21	0·8	39	66,445	298	4·4	25	31,092	189	6·0	25	33,157	237	7·1
June	11	13,588	29	2·1	1	25,462	3	0·1	13	31,303	136	4·3	12	17,360	130	7·4	8	17,193	134	7·7
July	9	14,788	170	11·4	1	25,462	5	0·1	5	13,164	73	5·5	...	...	...	...	4	5,514	80	14·5
August	14	23,741	267	11·2	1	25,462	30	1·1	4	12,018	116	9·6	3	7,973	56	7·9	3	4,731	97	2·5
September	3	5,853	21	3·5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
October	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
November	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
December	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	65	112,667	924	8·2	1	25,462	187	7·3	77	137,076	1,596	11·6	64	74,141	969	13·1	56	76,405	1,213	15·8

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Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Kurnool District during each Month of the Year 1877—(Continued).

Taluqs	Koilkuntla.				Sirwell.				Cumbum.				Markapur.				...				Total.			
Population	98,841.				71,089.				123,084.				92,665.				...				914,232.			
Total No. of Villages in each Circle.	86.				85.				108.				96.				...				787.			
Months.	No. of Villages affected	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	39	51,224	624	12·1	4	6,369	19	2·8	20	32,179	369	11·4	27	40,652	222	5·4	...	...	...	..	147	252,312	1,989	7·8
February	23	29,917	191	6·3	8	3,991	45	11·7	11	19,887	182	9·1	40	53,801	831	15·4	...	...	...	...	112	202,895	1,463	7·2
March	24	30,182	151	5·0	20	21,612	176	8·0	39	67,793	457	6·7	38	48,963	364	7·4	...	...	...	...	243	379,724	2,008	5·2
April	14	17,953	64	3·0	24	28,066	198	7·0	36	64,449	423	6·5	14	21,330	145	6·7	...	...	...	...	188	305,301	1,715	5·6
May	23	27,077	127	4·6	27	31,651	191	6·0	30	51,042	234	4·5	7	11,370	57	5·0	...	...	...	...	194	302,674	1,437	4·7
June	14	16,038	48	2·9	5	7,971	43	5·3	11	20,088	32	1·5	3	2,902	11	3·7	...	...	...	...	78	151,854	566	3·7
July	3	2,962	31	10·4	1	2,986	5	1·6	4	13,145	45	3·4	5	8,433	64	7·5	...	...	...	...	32	86,454	473	5·4
August	3	6,649	24	3·6	1	2,986	1	0·3	4	13,535	100	7·3	3	5,724	56	9·4	...	...	...	...	36	102,813	747	7·2
September	1	3,908	2	0·5	...	...	...	...	...	...	...	...	1	1,351	8	5·9	...	...	...	...	5	11,112	31	2·7
October	2	5,361	5	0·8	...	...	...	...	1	4,349	17	3·9	...	...	...	...	...	...	...	...	3	9,710	22	2·2
November	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
December	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	66	83,823	1,267	15·1	49	49,989	678	13·5	74	111,286	1,859	16·7	65	82,550	1,758	21·3	...	...	...	...	517	753,399	10,451	13·8

410. The total number of cholera deaths registered in this district was very large, viz., 33,102. As in Kurnool, the cholera pestilence became active in December 1876, when the population began to leave their homes in search of food and work. The highest mortality occurred in January and February 1877, and in these two months 18,140 deaths from cholera were registered. The mortality in the upland taluqs of Royachoti, Kadiri, Voilpaud, and Madanapalli, which were the worst taluqs also as regards famine distress, was truly fearful, and it is quite certain that the registration failed to note a large number of deaths. On some works, and in certain villages, the explosions of cholera were so sudden and violent, as to present all the characteristics of water-poisoning. The dead and dying were left as they fell, and the panic was so great that entire villages were deserted *pro temp.* In March and following months the cholera mortality largely abated, and by September it was evident that the epidemic was disappearing. In December only 7 villages were affected, returning 69 deaths. In January 651 villages were affected out of 1,311. In December deaths were returned only from two taluqs, and early in the present year the disease entirely passed away.

Cuddapah.

411. In the month of May an outbreak occurred in the town of Cuddapah. Cuddapah is but an insignificant town of about 16,000 inhabitants, but in this sudden outbreak in May 95 persons were registered as dying of cholera. The attacks were not confined to the poor; several wealthy merchants and their families suffered, and the disease very suddenly appeared in almost every part of the town. At this time owing to the drought most of the water used for drinking was taken from a public well fed by springs from the bed of the river, or from holes dug in the river-bed. These sources were liable to constant pollution. The outbreak had the general characteristics of one due to water-poisoning in its sudden and rapid attack. At this time famine laborers from Bellary were being daily halted near the town on their way to the Nellore District, and cholera had been present in the halting camp before the outbreak in the town. Local outbreaks of cholera continued in the Cuddapah District until September. Dr. MacNally, Sanitary Inspector, and Col. A. Moberly, R.E., were both attacked in September in different localities, and narrowly escaped with their lives.

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Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Cuddapah District during each Month of the Year 1877.

Taluqs ...	Budwail.				Proddatur.				Sidhout.				Pullampet.			
Population ...	93,049.				102,732.				76,662.				145,153.			
Total No. of Villages in each Circle.	119.				85.				82.				143.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January ...	54	56,352	575	10·2	31	59,719	181	3·0	45	54,210	424	7·8	71	120,529	1,239	10·2
February ...	35	45,879	255	5·6	28	62,002	162	2·6	18	26,345	90	3·4	56	95,694	631	6·5
March ...	26	37,390	166	4·4	32	59,786	199	3·3	10	13,684	38	2·7	20	46,899	156	3·3
April ...	23	37,822	121	3·1	28	46,148	153	3·3	5	10,551	28	2·6	15	31,764	80	2·5
May ...	23	32,985	246	7·4	45	77,350	238	3·3	14	18,902	68	3·5	20	49,966	141	2·8
June ...	5	17,851	57	3·1	30	51,744	181	3·0	6	14,900	25	1·6	14	29,148	115	3·9
July ...	7	18,702	39	2·0	26	43,981	97	2·5	5	7,232	21	2·9	25	40,577	106	2·6
August ...	8	13,425	21	1·5	24	41,271	128	3·1	1	240	1	4·1	23	56,686	152	2·6
September ...	10	15,992	40	2·5	15	37,019	57	1·5	3	1,895	6	0·7	9	22,632	37	1·6
October ...	7	13,348	19	1·4	8	12,570	28	2·2	1	603	3	4·9	14	26,763	46	1·7
November ...	2	5,965	7	1·1	...	...	...	...	...	...	...	...	8	17,279	82	4·7
December ...	...	...	...	...	...	...	...	...	...	...	...	...	6	11,909	68	5·7
Total ...	77	82,106	1,546	18·8	70	100,300	1,374	13·7	56	62,810	704	11·2	88	126,754	2,853	22·5

Taluqs ...	Cuddapah.				M. T. Cuddapah.				Jammalamadugu.			
Population ...	146,706.				16,184.				109,961.			
Total No. of Villages in each Circle.	165.				1.				133.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January ...	49	75,220	474	6·3	1	16,184	55	3·3	37	47,795	319	6·6
February ...	26	44,428	119	2·6	1	16,184	23	1·4	44	54,545	333	6·1
March ...	15	15,977	82	5·1	1	16,184	8	0·4	35	46,599	187	4·0
April ...	21	39,774	61	1·5	1	16,184	39	2·4	29	37,722	247	6·5
May ...	50	79,575	256	3·2	1	16,184	95	5·8	36	45,010	291	6·4
June ...	31	60,190	189	3·1	1	16,184	22	1·3	41	44,078	408	9·2
July ...	31	57,869	154	2·6	1	16,184	8	0·4	29	33,428	127	3·7
August ...	15	35,577	57	1·6	1	16,184	5	0·3	15	28,096	80	2·8
September ...	12	25,647	46	1·7	1	16,184	14	0·8	18	24,270	67	2·7
October ...	3	2,500	3	1·2	...	...	...	...	4	4,947	6	1·2
November ...	2	2,145	2	0·9	...	...	...	...	...	...	...	...
December ...	...	...	...	...	...	...	...	...	1	2,488	1	0·4
Total ...	95	129,310	1,443	11·2	1	16,184	269	47·6	104	101,777	2,066	20·8

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Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Cuddapah District during each Month of the Year 1877—(Continued).

Taluqs	Pulivendla.				Royachoty.				Kadiri.				Voilpaud.				Madanapalli.				Total.			
Population	110,405.				120,150.				140,922.				145,581.				135,462.				1,350,967.			
Total No. of Villages in each Circle.	114.				104.				152.				118.				105.				1,811.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	23	33,637	207	6·1	80	121,896	1,702	13·9	91	109,539	1,241	11·3	104	142,101	2,385	16·7	65	112,053	1,122	10·0	651	949,235	9,924	10·4
February	44	61,111	513	8·3	66	105,425	1,000	9·4	95	117,861	1,794	15·2	96	137,011	1,791	13·0	69	119,815	1,505	12·5	578	885,800	8,216	9·2
March	33	38,173	191	5·0	38	63,441	252	3·8	63	92,377	876	9·4	70	112,266	744	6·6	51	103,002	662	6·4	394	645,778	3,561	5·5
April	19	19,459	109	5·6	35	66,441	297	4·4	32	52,886	188	3·5	53	83,947	355	4·2	38	82,015	557	6·7	299	524,671	2,235	4·2
May	37	21,454	223	10·3	49	82,159	296	3·6	25	31,649	109	3·4	45	84,442	269	3·1	46	102,171	597	5·8	391	641,847	2,829	4·4
June	59	73,527	612	8·3	25	38,088	167	4·3	61	75,963	317	4·1	23	37,574	169	4·4	28	60,074	289	4·6	324	519,321	2,501	4·8
July	34	48,286	249	5·1	13	21,439	51	2·3	40	56,601	241	4·2	14	25,105	40	1·5	17	33,719	63	1·8	242	403,123	1,196	2·9
August	9	12,072	34	2·8	21	27,482	249	9·0	34	51,003	221	4·3	43	62,522	400	6·3	32	60,440	319	5·2	226	404,948	1,667	4·1
September	2	3,231	12	3·7	15	21,073	187	8·8	15	20,217	81	4·0	10	11,913	54	4·5	9	24,022	50	2·0	119	230,295	651	2·8
October	3	4,670	6	1·2	4	5,084	15	2·9	3	7,640	9	1·1	2	1,855	5	2·6	4	11,698	9	0·7	53	91,678	149	1·6
November	...	...	...	...	...	...	...	...	1	5,690	2	0·3	1	631	10	15·8	1	1,169	1	0·8	15	32,879	104	3·1
December	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	7	14,397	69	4·8
Total ...	88	108,054	2,156	20·9	88	125,732	4,216	33·5	122	132,340	5,079	45·2	107	148,059	6,222	42·0	90	138,458	5,174	34·9	986	1,266,884	33,102	26·1

412. The course of the cholera epidemic in Bellary was similar to that in Kurnool and Cuddapah. It began to increase with epidemic severity in November and December 1876, and went on increasing in severity until March. It then began to decline through April, May, June and July, and in August it had ceased to be generally epidemic. In the last quarter of the year only 21 deaths were recorded from cholera in the whole district. The total number of registered cholera deaths in the district was 30,183, but 18,089 of these occurred in the first three months of the year. This district suffered intensely from scarcity and foulness of water-supply, and frequent outbreaks of cholera occurred in the numerous working gangs of relief laborers employed on public roads. Mr. Oldham, B.C.S., who was in charge of relief operations at Adoni, describes a most virulent outbreak of cholera on one of the roads in his taluq in May. Captain Shortland, R.A., on famine duty was attacked on this occasion, and Mr. Oldham describes the road covered with dead and dying as "resembling a battle-field." Another very severe outbreak occurred in Tadpatry Taluq on one of the relief roads. These localized outbreaks I have no doubt were much influenced by the use of polluted water. In July during my inspection of the Ghooty Taluq, the only water locally procurable smelt so unpleasantly that bathing in it was disagreeable. A famine officer at Caroor had to send into Ghooty, a distance of 20 miles, to get water fit to drink, but the 20 or 30,000 relief laborers under his orders had to use the best they could get locally; and in not a single well I examined was the water in a wholesome state. Rain began to fall in the district in the end of July and early in August, and from this time cholera declined most rapidly all over the extensive district.

Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Bellary District during each Month of the Year 1877.

Taluqs ...	Bellary.				M. T. Bellary.				Hospet.				Kudlighee.			
Population ...	180,474.				49,959.				98,420.				98,227.			
Total No. of Villages in each Circle.	179.				1.				148.				383.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January ...	18	29,171	118	4·0	1	49,959	78	1·5	35	58,986	210	3·9	18	10,716	190	18·5
February ...	8	18,998	86	2·5	1	49,959	69	1·3	33	40,770	179	4·8	24	19,065	226	11·8
March ...	21	34,152	118	3·4	1	49,959	118	2·8	38	54,890	382	6·9	15	22,198	230	10·3
April ...	20	35,561	324	9·1	1	49,959	46	0·9	25	38,961	109	2·7	12	12,526	116	9·3
May ...	15	31,689	76	2·4	1	49,959	67	1·3	31	37,291	328	3·6	15	9,610	76	7·9
June ...	15	23,980	105	4·5	1	49,959	79	1·5	45	57,918	519	8·9	8	8,248	41	4·9
July ...	10	4,440	32	7·2	1	49,959	29	0·5	17	24,411	210	3·6	4	6,488	28	4·3
August ...	9	8,557	105	12·2	1	49,959	40	0·8	1	778	4	5·1	1	221	9	4·7
September ...	8	2,138	48	20·1	1	49,959	14	0·2	...	...	...	...	...	...	...	...
October ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
November ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
December ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	49	61,709	957	15·5	1	49,959	540	10·8	78	65,919	1,936	29·6	54	34,587	925	267

Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Bellary District during each Month of the Year 1877—(Continued).

Taluqs	Huvenhadgully.				Hurpunhully.				Alur.			
Population	89,494.				85,720.				98,226.			
Total No. of Villages in each Circle.	163.				240.				106.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	40	38,029	349	9·1	9	10,005	57	5·6	50	65,621	889	13·5
February	51	44,686	405	9·0	20	22,171	152	6·8	36	48,749	287	5·8
March	41	32,208	136	4·2	41	33,548	363	10·8	43	49,717	311	6·2
April	40	39,739	182	4·5	25	22,605	185	8·1	10	13,004	69	5·3
May	18	15,661	70	4·3	9	7,886	25	3·1	8	14,899	72	4·8
June	15	11,381	62	5·4	10	7,381	124	16·7	19	26,069	93	3·5
July	2	4,735	3	0·6	3	2,287	16	6·9	34	40,172	297	7·3
August	...	...	...	...	...	...	...	...	13	17,925	56	3·1
September	...	...	...	...	...	...	...	...	3	2,670	9	3·3
October	...	...	...	...	...	...	...	...	1	828	2	2·4
November	...	...	...	...	...	...	...	...	1	826	2	2·4
December	...	...	...	...	...	...	...	...	1	828	4	4·8
Total ...	82	64,397	1,207	13·7	64	46,241	922	19·9	69	81,291	2,091	25·7

Taluqs	Adoni.				M. T. Adoni.				Ghooty.			
Population	158,789.				22,722.				137,766.			
Total No. of Villages in each Circle.	203.				1.				157.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	42	58,712	499	8·4	1	22,722	133	5·8	54	63,031	590	9·3
February	51	64,672	474	7·3	1	22,722	201	8·8	36	51,796	179	3·4
March	37	44,046	307	6·9	1	22,722	84	3·7	44	55,389	512	9·2
April	24	33,902	197	5·8	1	22,722	10	0·4	29	42,319	325	7·6
May	45	57,007	366	6·4	1	22,722	21	0·9	12	17,972	82	4·5
June	24	31,433	141	4·4	1	22,722	9	0·3	14	28,841	97	3·3
July	27	41,494	263	6·3	1	22,722	142	6·2	19	34,203	140	4·0
August	22	34,149	180	5·3	1	22,722	24	1·0	14	13,034	98	7·5
September	4	5,970	43	7·2	1	22,722	17	0·7	1	1,128	4	3·5
October	1	2,780	9	3·2	1	22,722	1	...	...	...	...	...
November	...	...	...	...	...	...	...	...	...	...	...	...
December	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	105	118,710	2,479	20·9	1	22,722	642	28·2	88	89,322	2,027	22·7

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Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Bellary District during each Month of the Year 1877—(Continued).

Taluqs	M. T. Ghooty.				Tadpatry.				Raidroog.				Anantapore.				M. T. Anantapore.				Darmaveram.			
Population	6,705.				117,199.				87,774.				97,843.				4,909.				120,550.			
Total No. of Villages in each Circle.	1.				97.				156.				127.				1.				196.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	1	6,705	20	2·9	...	...	395	...	...	...	65	...	...	...	157	...	1	4,909	1	0·2	...	...	118	...
February	1	6,705	1	0·1	40	45,768	338	7·3	11	8,307	25	3·0	47	44,929	352	7·8	1	4,909	17	3·4	51	54,420	376	6·9
March	1	6,705	48	7·1	38	47,608	301	6·3	13	14,010	58	4·1	36	35,999	205	5·6	1	4,909	7	1·4	74	61,128	897	1·4
April	1	6,705	13	1·9	47	67,704	599	8·8	34	26,552	213	8·0	23	25,498	138	5·4	...	...	...	...	55	53,655	378	7·0
May	1	6,705	2	0·2	42	66,032	434	6·5	52	37,217	260	6·9	12	12,279	107	8·7	1	4,909	7	1·4	50	42,413	302	7·1
June	1	6,705	2	0·2	27	37,960	214	5·6	34	20,839	140	6·6	33	34,920	198	5·6	1	4,909	9	1·8	45	39,906	294	7·3
July	1	6,705	...	...	21	45,710	303	6·6	17	18,295	58	3·1	28	30,285	97	3·2	1	4,909	1	0·2	49	43,167	424	9·8
August	...	...	...	...	9	21,061	23	1·0	21	24,479	54	2·2	5	8,581	16	1·8	1	4,909	4	0·8	25	21,478	107	4·9
September	...	...	...	...	6	8,426	18	2·1	8	12,336	23	1·8	...	...	...	...	...	...	...	...	13	15,515	50	3·2
October	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1,581	1	0·6
November	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
December	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	1	6,705	86	9·8	72	79,925	2,625	32·8	78	54,033	896	16·5	78	77,212	1,270	16·4	1	4,909	46	9·3	97	93,580	2,947	31·5

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Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Bellary District during each Month of the Year 1877—(Continued).

Taluqs	Pennaconda.				Hindupur.				Madaksera.				Soondoor Territory.				Total.			
Population	88,747.				87,895.				79,457.				14,981.				1,665,815.			
Total No. of Villages in each Circle.	115.				113.				159.				...				2,843.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	...	...	140	...	...	...	41	...	...	...	62	...	...	...	70	...	...	...	4,191	...
February	51	52,960	1,097	26·7	62	56,232	953	16·9	64	56,282	1,571	27·9	5	9,029	15	1·6	594	618,124	6,953	11·2
March	44	48,100	526	10·9	78	66,456	1,558	23·4	71	56,894	716	12·5	8	6,904	68	9·8	646	747,537	6,945	9·2
April	17	25,547	79	3·0	25	25,404	172	6·7	37	35,770	246	6·8	5	6,912	14	2·0	432	589,954	3,415	5·7
May	12	13,964	101	7·2	13	8,156	63	7·8	36	27,891	242	8·6	6	3,598	12	3·3	350	487,830	2,708	5·4
June	17	26,534	80	3·0	7	13,227	36	2·7	53	41,924	453	10·8	8	10,610	18	1·6	878	504,561	2,714	5·3
July	19	31,539	70	2·2	4	7,526	8	1·0	22	22,674	89	3·9	2	5,082	5	0·9	281	439,988	2,215	5·0
August	1	3,145	39	12·4	3	1,759	15	8·5	4	1,163	23	19·7	...	...	...	...	131	233,864	797	3·4
September	2	1,707	2	1·1	1	1,102	1	0·9	...	...	...	...	...	...	...	...	42	123,673	224	1·8
October	...	...	...	...	...	...	...	...	1	114	2	17·5	...	...	...	...	4	4,253	15	3·5
November	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	826	2	2·4
December	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	828	4	4·8
Total ...	68	87,231	2,134	24·4	85	64,087	2,847	44·4	83	63,202	3,404	53·5	14	13,522	203	14·9	1,167	1,179,263	30,183	25·6

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413. This district suffered much from famine and cholera. The total of cholera deaths was 42,145. The greatest mortality occurred in January and February, just as in the other famine districts. There was a slight increase also in July and August. The deaths in January were 9,605, and in December had fallen to 78.

North Arcot.

414. The mortality from cholera in this district was highest when the relief measures were but inadequately organized, and although the population continued to suffer greatly from famine up to the end of the year, the epidemic of cholera declined. The towns, which were relief centres, suffered a good deal from cholera.

Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the North Arcot District during each Month of the Year 1877.

Taluqs	Chittoor.				Chendragherry.				Palmanair.				Gudiathum.				Vellore.			
Population	212,949.				99,598.				60,194.				162,969.				141,020.			
Total No. of Villages in each Circle.	714.				326.				565.				265.				192.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	234	117,962	2,156	18·2	139	67,365	963	14·2	26	9,414	148	14·6	53	57,265	379	6·6	41	52,233	238	4·5
February	222	137,541	2,241	16·2	132	97,026	958	9·8	48	13,135	193	14·6	95	92,177	836	9·0	64	81,629	434	5·3
March	117	60,140	688	11·4	85	57,023	416	7·2	64	19,695	288	14·6	72	66,773	452	6·7	54	59,638	288	4·8
April	28	24,036	91	3·7	38	19,541	112	5·7	72	20,235	453	25·3	57	65,894	201	3·0	33	41,932	153	3·6
May	51	35,075	132	3·7	29	32,206	136	4·2	61	17,563	310	17·6	54	59,940	218	3·5	35	44,573	147	3·2
June	28	25,802	130	5·0	37	34,107	206	6·0	30	7,650	193	25·6	40	44,697	151	3·3	34	34,119	103	3·0
July	...	...	212	...	...	...	282	...	...	...	201	...	...	...	203	...	...	...	191	...
August	70	49,797	397	7·9	30	33,408	138	4·1	20	5,392	42	7·7	70	71,499	299	4·1	58	44,356	242	5·4
September	62	40,220	270	6·7	15	20,232	114	5·6	10	886	26	29·3	57	60,370	261	4·3	43	45,251	289	6·3
October	24	15,689	123	7·8	10	13,875	36	2·5	2	279	4	14·3	36	40,392	169	4·1	28	32,717	143	4·3
November	1	1,131	5	4·4	...	...	...	...	...	...	...	...	4	4,190	17	4·0	1	644	1	1·5
December	...	...	...	...	...	...	...	...	...	...	...	...	5	15,229	23	1·4	6	3,871	21	5·4
Total ...	381	169,644	6,445	37·9	224	101,784	3,361	33·0	104	26,436	1,858	70·3	147	113,103	3,204	28·3	84	102,325	2,250	21·9

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Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the North Arcot District during each Month of the Year 1877—(Continued).

Taluqs	M. T. Vellore.				Poloor.				Wandewash.				Arcot.			
Population ...	35,769.				109,150.				153,507.				157,387.			
Total No. of Villages in each Circle.	1.				231.				424.				356.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	1	37,569	72	1·9	19	20,251	146	7·2	37	23,619	222	9·3	75	72,532	424	5·8
February	1	37,569	141	3·7	22	19,544	90	4·6	48	30,151	295	9·7	78	78,185	358	4·5
March	1	37,569	68	1·8	23	24,766	73	2·9	51	33,028	215	6·5	75	66,358	399	5·8
April	1	37,569	91	2·4	36	29,866	160	5·3	34	22,252	92	4·1	52	47,981	143	2·9
May	1	37,569	126	3·3	70	61,886	671	10·9	41	28,455	212	7·4	47	51,871	171	3·2
June	1	37,569	51	1·3	45	41,863	293	6·9	72	42,210	312	7·3	30	...	80	...
July	...	...	135	...	...	...	333	...	...	...	741	...	...	...	541	...
August	1	37,569	108	2·8	75	55,103	397	7·2	106	49,884	625	12·5	95	72,644	484	6·6
September	1	37,569	47	1·2	48	35,322	290	8·2	61	41,382	319	7·7	30	16,949	62	3·6
October	1	37,569	4	0·1	10	6,529	40	6·6	28	19,729	89	4·5	11	6,415	27	4·3
November	...	...	...	...	7	4,500	33	7·3	...	...	...	...	...	...	...	...
December	1	37,569	1	...	2	5,993	4	0·6	...	...	...	...	...	...	...	...
Total ...	1	37,569	844	22·4	90	78,526	2,330	32·2	129	68,228	3,122	45·7	150	85,428	2,689	31·4

Taluqs	Wallajah.				M. T. Wallajah.				Zemindaries.				Total.			
Population ...	203,841.				10,299.				663,976.				2,014,254.			
Total No. of Villages in each Circle.	311.				1.				1,855.				5,241.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	140	105,924	1,624	15·3	1	12,099	30	2·4	422	295,355	3,203	10·8	1,189	871,588	9,605	11·0
February	108	90,517	549	6·0	1	12,099	19	1·5	337	279,881	2,318	8·2	1,149	969,454	8,432	8·6
March	69	50,987	309	6·0	1	12,099	15	1·2	310	264,666	2,446	9·2	922	752,692	5,657	7·5
April	61	49,393	203	4·1	1	12,099	10	0·8	238	151,043	1,022	6·7	651	521,841	2,731	5·2
May	39	43,222	105	2·4	1	12,099	9	0·7	193	158,589	1,229	7·7	622	582,548	3,461	5·9
June	13	...	28	...	1	12,099	7	0·5	137	146,983	556	3·7	424	415,000	2,110	5·0
July	...	...	79	...	1	12,099	29	2·3	...	...	643	...	...	...	3,590	...
August	33	45,628	169	3·7	1	12,099	16	1·3	148	135,976	642	4·9	706	651,256	3,559	5·4
September	11	18,815	20	1·0	...	...	...	...	75	51,634	277	5·3	413	368,630	1,975	5·3
October	2	1,884	4	2·1	...	...	...	...	68	47,091	252	5·3	220	222,169	891	4·0
November	...	...	...	...	...	...	...	...	...	...	...	...	13	10,465	56	5·3
December	3	5,590	9	1·6	1	12,099	10	0·8	1	...	10	...	19	80,351	78	0·9
Total ...	162	121,122	3,099	25·5	1	12,099	145	11·9	536	385,157	12,598	32·7	2,009	1,301,421	42,145	323

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415. The cholera mortality in this district was very high. 47,633 deaths were registered. The mortality was highest in the Salem and Oossoor Taluqs. The epidemic prevailed in great force for the first five months of the year, and declined in June. In December cholera had much declined, only 290 deaths being registered in that month and the Oossoor Taluq quite free. In Salem the famine was prolonged and severe; but here, again, the cholera epidemic began to decline before the greatest food-distress existed.

Salem.

Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Salem District during each Month of the Year 1877.

Taluqs	Salem.				M. T. Salem.				Athur.				Namacal.				Trichengode.			
Population	343,584.				49,873.				164,005.				260,984.				249,662.			
Total No. of Villages in each Circle.	636.				1.				193.				574.				598.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	203	211,150	2,134	10·1	1	49,873	89	1·7	59	86,715	296	3·4	86	121,455	956	7·8	116	201,031	1,414	7·0
February	172	197,354	1,321	6·6	1	49,873	98	1·9	33	50,701	230	4·5	60	107,397	412	3·7	92	167,059	802	4·7
March	159	174,817	1,098	6·2	1	49,873	47	0·9	42	61,010	176	2·8	41	71,168	290	4·0	78	144,167	779	5·4
April	169	193,408	1,324	6·8	1	49,873	68	1·3	34	56,921	129	2·2	66	97,648	331	3·3	88	166,068	759	4·5
May	206	215,903	1,861	8·6	1	49,873	70	1·4	44	57,019	225	3·9	103	156,738	862	5·4	91	157,299	800	5·0
June	142	165,596	802	4·2	1	49,873	26	0·5	21	31,938	62	1·9	64	118,103	306	2·6	48	81,675	308	3·7
July	84	98,484	297	3·0	1	49,873	16	0·3	26	33,607	308	9·1	71	117,918	532	4·5	30	59,999	258	4·3
August	71	85,222	331	3·8	1	49,873	11	0·2	38	64,054	264	4·1	77	117,648	693	5·8	36	68,495	252	3·6
September	69	68,719	281	4·0	1	49,873	6	0·1	67	93,188	526	5·6	62	102,949	586	5·6	22	46,725	187	4·0
October	46	50,338	210	4·1	...	...	...	...	44	53,270	159	2·9	41	57,980	169	2·9	10	24,312	43	1·7
November	18	23,845	69	2·0	...	...	...	...	26	31,878	106	3·3	34	59,728	216	3·6	3	3,619	26	7·1
December	22	33,388	80	2·3	1	49,873	14	0·2	19	23,562	42	1·7	22	35,569	74	2·0	1	1,100	1	0·1
Total ...	476	441,991	9,808	22·2	1	49,873	445	8·9	99	129,731	2,523	19·4	159	242,053	5,427	22·4	198	331,666	5,629	16·9

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Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Salem District during each Month of the Year 1877—(Continued).

Taluqs	Oossoor.				Kistnagherry.				Darampoori.				Tripatur.				Utangherry.				Total.			
Population ...	192,939.				170,232.				190,617.				190,666.				153,798.				1,966,362.			
Total No. of Villages in each Circle.	942.				612.				740.				448.				568.				5,312.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	41	29,435	229	7·7	57	41,523	409	9·8	128	70,778	847	11·9	12	28,446	34	1·1	50	30,488	380	12·4	753	870,894	6,788	7·7
February	134	59,500	1,120	18·8	116	68,171	713	10·4	192	92,208	1,278	13·8	68	68,748	432	6·2	109	57,716	752	13·0	970	918,737	7,158	7·7
March	264	93,243	1,800	19·3	203	93,588	1,303	13·9	173	83,524	1,036	12·4	135	114,606	955	8·3	148	67,460	1,039	15·3	1,244	953,456	8,523	8·8
April	260	92,812	1,938	20·8	144	69,647	722	10·3	90	51,300	397	7·7	100	101,911	540	5·2	100	50,794	667	13·1	1,052	930,382	6,875	7·3
May	205	79,470	1,311	16·4	137	70,911	689	9·7	96	51,900	471	9·0	87	89,071	478	5·3	78	42,194	562	13·3	1,048	970,373	7,329	7·5
June	92	43,203	483	11·1	45	31,096	230	7·3	29	17,548	176	10·0	39	47,828	188	3·9	28	15,974	87	5·4	509	597,824	2,668	4·4
July	31	24,537	187	7·6	20	14,326	58	3·3	20	8,102	103	12·7	33	41,662	183	4·3	29	10,624	132	12·4	345	459,132	2,074	4·5
August	34	22,867	202	8·8	21	19,496	89	4·5	8	4,285	38	8·8	39	46,985	274	5·8	33	16,301	124	7·6	358	495,226	2,278	4·5
September	28	38,050	148	3·8	20	16,524	111	6·6	10	10,081	47	4·6	28	36,686	247	6·7	13	46,062	161	3·4	320	508,857	2,300	4·5
October	12	4,248	42	9·8	5	7,155	13	1·7	3	1,125	16	14·2	13	20,998	127	4·2	8	6,868	18	2·6	183	226,189	797	3·5
November	2	871	3	3·4	3	5,298	6	1·1	2	2,104	5	2·3	16	31,128	67	2·1	14	2,685	55	20·4	118	161,156	553	3·4
December	...	...	...	...	1	4,784	1	0·2	4	5,156	16	3·1	13	21,432	52	2·4	2	1,105	10	9·0	84	126,096	290	2·2
Total ...	488	165,276	7,463	45·1	837	149,592	4,344	29·0	809	137,727	4,430	32·1	171	128,466	3,577	27·8	205	94,887	3,987	42·0	2,443	1,871,262	47,633	25·4

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416. Coimbatore. This district, which at one time was thought would not suffer much from famine, was severely affected by cholera. The total number of deaths was 36,622. The mortality was great all through the first nine months of the year, being highest in May, June and September. The mortality was highest in Erode, Sattiamungalum, Pollachy, Oodumalapettah and Darapuram. Cholera was later in developing itself in this district than in many others. The subsoil water in this district continued to sink lower and lower until September. After good rain in October cholera mortality began to decline.

*Table showing particulars of Cholera Deaths in the different Taluqs and **Municipal** Towns of the Coimbatore District during each Month of the Year 1877.*

Taluqs	Coimbatore.				M. T. Mettapoliem.				M. T. Coimbatore.				Erode.			
Population	169,449.				4,144.				34,968.				228,353.			
Total No. of Villages in each Circle	286.				1.				1.				209.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	9	14,279	29	2·0	1	4,144	24	5·7	1	34,968	10	0·2	79	115,833	611	5·2
February	13	1,664	84	50·4	1	4,144	38	9·1	1	34,968	46	1·3	96	138,437	606	4·3
March	34	58,440	274	4·6	1	4,144	13	3·1	1	34,968	18	0·5	58	102,181	496	4·8
April	46	76,852	269	3·5	1	4,144	11	2·6	1	34,968	14	0·4	105	159,260	1,343	8·4
May	57	79,355	424	5·3	1	4,144	4	0·9	1	34,968	22	0·6	74	128,075	723	5·6
June	70	92,200	498	5·4	...	...	...	...	1	34,968	30	8·5	78	121,059	451	3·7
July	56	76,731	335	4·3	...	...	...	...	1	34,968	41	1·1	67	97,921	462	4·7
August	48	57,781	303	5·2	1	4,144	1	0·2	1	34,968	19	1·5	36	79,987	212	2·6
September	68	80,645	470	5·8	...	...	...	...	1	34,968	21	0·6	63	108,465	477	4·3
October	51	59,761	337	5·6	...	...	...	...	1	34,968	17	0·4	35	71,002	162	2·2
November	23	23,171	129	5·5	...	...	...	...	1	34,968	24	0·6	12	33,051	62	1·8
December	5	9,469	12	1·2	1	4,144	1	0·2	1	34,968	6	0·1	2	5,879	8	1·8
Total ...	123	152,589	3,164	20·7	1	4,144	92	22·2	1	34,968	268	7·7	160	206,054	5,613	27·2

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Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Coimbatore District during each Month of the Year 1877—(Continued).

Taluqs	M. T. Erode.				Sattiamungalam.				Pollachy.				Palladum.				Bowany.			
Population	10,188.				169,613.				167,545.				237,745.				102,803.			
Total No. of Villages in each Circle.	1.				237.				164.				194.				67.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	1	10,188	15	1·4	44	67,261	504	7·4	11	44,392	105	2·3	15	29,174	74	2·5	31	59,623	331	5·5
February	1	10,188	1	0·09	63	96,855	874	9·0	40	83,585	251	3·0	28	43,871	72	1·6	40	69,601	432	6·2
March	1	10,188	1	0·09	35	56,739	298	5·2	40	81,517	349	4·2	41	55,304	270	4·8	39	75,005	572	7·6
April	1	10,188	34	3·3	57	84,935	428	5·0	20	26,118	131	5·0	99	173,659	822	4·7	24	53,720	179	3·3
May	1	10,188	40	3·8	105	126,657	1,122	8·8	53	82,320	535	6·4	98	153,929	1,341	8·7	29	47,432	301	6·3
June	1	10,188	44	4·3	49	74,568	385	5·1	80	117,070	1,111	9·4	59	87,468	415	4·7	30	55,570	324	5·7
July	1	10,188	233	22·8	28	38,294	155	4·0	37	59,323	277	4·6	62	92,120	563	6·1	5	16,070	26	1·6
August	1	10,188	51	4·0	26	37,425	265	7·0	41	89,240	421	4·7	66	99,189	448	4·5	12	28,956	96	3·3
September	...	...	...	...	47	71,664	487	6·7	36	71,836	277	3·8	79	112,618	594	5·2	19	43,311	144	3·3
October	...	...	...	...	27	46,737	260	5·5	20	34,601	117	3·3	48	83,518	277	3·3	21	50,664	153	3·0
November	...	...	...	...	28	45,558	181	3·8	5	4,152	40	9·6	19	39,042	79	2·0	11	29,751	45	1·5
December	...	...	...	...	5	8,882	16	1·8	4	6,760	31	4·5	3	7,806	10	1·2	2	5,620	8	1·4
Total ...	1	10,188	419	41·1	180	237,372	4,975	20·9	103	140,931	3,645	25·8	149	216,029	4,965	22·9	50	87,610	2,611	29·8

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Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Coimbatore District during each Month of the Year 1877—(Continued).

Taluqs	Collegal.				Oodumalapettah.				Caroor.				M. T. Caroor.				Darapuram.				Total.			
Population	90,825.				123,641.				166,270.				9,378.				217,489.				1,762,679.			
Total No. of Villages in each Circle.	150.				94.				91.				1.				83.				1,579.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	7	5,620	53	9·4	38	56,926	533	9·3	37	90,541	323	3·5	1	9,378	16	1·6	45	130,998	404	3·0	241	557,487	3,032	5·4
February	20	27,696	218	7·8	51	80,125	1,043	13·0	16	48,466	99	2·0	1	9,378	1	0·1	27	87,527	225	2·5	397	727,127	3,990	5·4
March	21	35,960	190	5·2	38	59,244	353	5·9	14	43,773	90	2·0	...	...	...	...	20	67,877	169	2·4	345	685,340	3,093	4·5
April	8	16,719	35	2·0	24	41,422	178	4·2	6	22,806	10	0·4	...	...	...	...	41	120,400	472	3·9	433	825,191	3,926	4·7
May	29	31,139	264	8·4	48	75,953	437	5·7	25	68,981	180	2·6	1	9,378	3	0·3	55	160,629	784	4·8	577	1,013,198	6,180	6·0
June	23	30,401	99	3·2	38	60,960	259	4·2	31	...	203	...	1	9,378	29	3·0	23	76,131	157	2·0	453	769,961	4,005	5·2
July	4	1,064	21	19·7	21	36,665	142	3·8	33	95,256	211	2·2	1	9,378	10	0·1	22	76,807	249	3·2	338	644,785	2,725	4·2
August	...	...	...	...	13	23,404	87	3·7	45	112,693	594	5·2	1	9,378	8	0·8	38	106,212	344	3·2	329	663,565	2,849	4·2
September	6	3,990	22	5·5	22	38,665	205	5·3	37	97,390	498	5·1	1	9,378	1	0·1	51	161,564	864	5·3	435	834,494	4,060	4·8
October	9	14,465	62	4·2	15	22,829	121	5·3	18	51,619	72	1·3	1	9,378	1	0·1	30	86,402	225	2·6	275	556,566	1,804	3·2
November	9	15,327	70	4·5	5	9,752	13	1·3	13	46,126	49	1·0	1	9,378	3	0·3	7	18,667	36	1·9	133	299,565	731	2·4
December	2	3,113	14	4·4	2	3,755	3	0·7	16	56,092	89	1·5	1	9,378	6	0·6	5	15,263	23	1·5	48	161,751	227	1·4
Total ...	61	78,965	1,048	13·2	76	122,902	3,374	27·4	66	169,612	2,418	14·2	1	9,378	78	8·3	72	194,616	3,952	20·3	1,044	1,665,358	36,622	21·9

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Neilgherries.

417. For the first time in our acquaintance with these hills, epidemic cholera has found a home in the Badager villages, and the sanatoria of Coonoor and Ootacamund. The disease prevailed in the hottest and driest months of the year, and the hills, like the plains, had suffered from scanty rainfall and drought. 476 deaths were reported, of which 93 occurred in Ootacamund and 50 in Coonoor.

418. In Ootacamund the localities affected were the lowest and filthiest parts of the native bazaars. Diarrhœa affected the European community, and one attack of cholera occurred in May. An account of the circumstances of the Ootacamund outbreak, investigated by Surgeon-General C. A. Gordon, C.B., as member of a Special Committee, will be found in the report of the Committee now under the consideration of Government. There can be no reasonable doubt that the disease was introduced into the station, and its spread was favored by climatic conditions, aided by insanitary surroundings. All the Neilgherry stations suffered much from scarcity and famine, and many wanderers came to the hills from Mysore and Coimbatore.

Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Neilgherry District during each Month of the Year 1877.

Taluqs	Neilgherries.				M. T. Ootacamund.				M. T. Coonoor.				Total.			
Population	35,245.				9,213.				2,908.				* 72,201.			
Total No. of Villages in each Circle.	18.				1.				1.				20.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	...	...	...	...	...	...	...	...	...	...	...	.	...	...	...	...
February	5	31,844	26	0·7	1	9,213	1	0·1	...	...	...	...	6	41,057	27	0·6
March	1	1,707	1	0·5	1	9,213	28	3·03	1	2,908	1	0·3	3	13,828	30	2·1
April	8	39,146	97	2·4	1	9,213	26	2·8	1	2,908	7	2·4	10	51,267	130	2·5
May	9	56,874	152	2·6	1	9,213	25	2·7	1	2,908	36	12·3	11	68,995	213	3·1
June	4	17,293	45	2·6	1	9,213	12	1·3	1	2,908	4	1·3	6	29,414	61	2·1
July	2	8,314	6	0·7	...	...	...	...	...	...	...	...	2	8,314	6	0·2
August	...	...	...	...	...	...	...	...	1	2,908	1	0·3	1	2,908	1	0·03
September ...	2	6,521	4	0·6	1	9,213	1	0·1	1	2,908	1	0·3	4	18,642	6	0·3
October	1	1,902	2	1·05	.	...	...	...	...	...	...	...	1	1,902	2	1·05
November	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
December	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	10	57,012	333	5·8	1	9,213	93	10·1	1	2,908	50	17·2	12	69,133	476	6·8

* Including population of 3 Amshoms forming S. E. Wynad.

South Canara.

419. This is a district in which cholera is rarely epidemic. In the beginning of the year (January) only 7 deaths were noted, but in June mortality began to increase, and in December there were 602 deaths, the total for the year being 2,900.

420. The disease was epidemic in the Municipal town of Mangalore in November and December.

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Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the South Canara District during each Month of the Year 1877.

Taluqs	Mangalore.				M. T. Mangalore.				Cassergode.			
Population	215,055.				29,423.				222,577.			
Total No. of Villages in each Circle.	315.				1.				243.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	1	572	1	1·7	...	...	...	...	...	...	...	...
February	...	...	...	...	...	...	...	...	...	...	...	...
March	9	10,539	13	1·2	...	...	...	...	1	1,011	1	0·9
April	8	8,514	30	3·5	1	29,423	1	0·03	6	9,814	24	2·4
May	4	4,337	8	1·7	..	...	...	...	6	10,461	13	1·2
June	5	4,064	7	1·7	...	...	...	...	18	23,589	101	4·2
July	3	1,620	8	4·9	...	...	...	...	19	37,170	115	3·1
August	13	13,233	22	1·6	...	...	...	...	21	41,930	134	3·2
September	32	36,832	115	3·1	1	29,423	2	0·06	14	16,089	64	3·9
October	47	49,940	191	3·8	1	29,423	2	0·06	33	55,354	165	2·9
November	69	65,606	237	3·6	1	29,423	27	0·9	33	45,514	123	2·7
December	13	13,171	44	3·3	1	29,423	20	0·6	48	64,255	283	3·6
Total ...	110	102,643	676	6·0	1	29,423	52	1·7	83	110,119	973	8·8

Taluqs	Uppinangadi.				Udipi.				Kundapur.				Total.			
Population	107,722.				222,554.				113,711.				918,042.			
Total No. of Villages in each Circle.	279.				263.				190.				1,291.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	...	...	...	...	...	...	...	...	5	4,257	6	1·4	6	4,829	7	1·4
February	1	2,222	6	2·7	1	665	5	7·5	1	1,123	1	0·8	8	4,010	12	2·9
March	5	6,398	17	2·6	1	4,611	1	0·2	3	8,057	8	0·9	19	30,611	40	1·3
April	18	12,097	38	3·1	1	1,915	1	0·5	4	7,251	6	0·8	38	69,014	100	1·4
May	14	10,931	35	3·2	2	2,492	2	0·8	7	9,774	11	1·1	33	37,995	69	1·8
June	16	10,549	54	5·1	5	5,998	18	2·1	16	15,691	41	2·7	55	59,291	216	3·6
July	8	4,901	26	5·3	13	22,383	57	2·5	8	7,517	12	1·5	51	73,591	218	2·9
August	10	10,126	26	2·5	9	8,159	26	3·1	3	1,017	12	11·8	56	74,465	220	2·9
September	7	6,814	16	2·5	13	13,901	34	2·4	8	7,638	33	4·3	75	110,197	264	2·3
October	9	5,286	33	6·2	20	25,590	81	3·1	12	15,372	26	1·6	122	180,965	498	2·7
November	7	3,945	22	5·5	39	47,737	239	5·06	4	6,330	6	0·9	153	198,555	654	3·2
December	34	18,838	97	5·1	37	47,951	206	4·2	2	3,129	2	0·6	135	176,767	602	3·4
Total ...	43	24,983	370	14·8	70	83,244	665	7·9	20	22,264	164	7·3	327	372,676	2,900	7·7

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421. The portions of the district suffering most from cholera were Palghat, Karambranad and Cherikal. The district was nearly free of cholera in the beginning of the year, but it continued to increase through February, March, April, May and June. At the end of the year cholera had almost died out. 9,957 deaths were registered.

Malabar.

422. There was some cholera, but not much in the Wynaad Taluq, and only 5 deaths in British Cochin. The mortality was high in the town of Calicut, possibly on account of the overcrowding of the town during the time of the famine rice traffic. The population of this district, though high prices prevailed, was not physically affected by famine, and the death-rate from all causes was not higher than the average.

Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Malabar District during each Month of the Year 1877.

Taluqs	Cherikal.				M. T. Cannanore.				Kottayam.				M. T. Tellicherry.				Karambranad.			
Population	225,749.				28,840.				123,014.				19,434.				243,640.			
Total No. of Villages in each Circle.	44.				1.				27.				1.				57.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
February	4	23,675	12	0·5	...	...	...	...	5	32,332	17	0·5	1	19,434	10	0·5	3	13,382	10	0·7
March	13	64,388	141	2·1	...	...	...	...	6	21,695	29	1·3	1	19,434	4	0·2	5	26,487	105	3·9
April	11	57,999	125	2·1	1	28,840	11	0·3	7	27,312	34	1·2	1	19,434	19	0·9	21	96,993	143	1·4
May	18	94,611	194	2·05	1	28,840	233	8·1	2	9,783	7	0·7	1	19,434	28	1·4	16	84,917	117	1·3
June	18	93,376	142	1·5	1	28,840	58	2·01	10	41,918	81	1·9	1	19,434	18	0·9	20	89,836	245	2·7
July	23	120,156	359	2·9	1	28,840	15	0·5	3	16,898	61	3·6	1	19,434	15	0·7	23	109,402	411	3·7
August	30	149,108	477	3·1	1	28,840	15	0·5	6	31,798	28	0·8	1	19,434	20	1·03	23	111,023	207	1·8
September	20	110,320	223	2·02	1	28,840	7	0·2	4	16,976	21	1·2	1	19,434	40	2·05	11	53,389	70	1·3
October	11	57,944	59	1·01	1	28,840	6	0·2	8	44,293	41	0·9	1	19,434	36	1·8	8	11,526	7	0·6
November	4	26,253	16	0·6	1	28,840	1	0·03	7	34,744	22	0·6	1	19,434	1	0·05	8	12,797	21	1·6
December	4	23,422	18	0·7	...	...	...	...	2	10,702	14	1·3	...	...	...	...	7	38,475	31	0·8
Total ...	44	125,187	1,766	14·1	1	28,840	346	11·9	13	51,996	355	6·8	1	19,434	191	9·8	32	151,014	1,367	9·3

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Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Malabar District during each Month of the Year 1877—(Continued).

Taluqs	Calicut.				M. T. Calicut.				Ernad.				Ponnany.				Walluvanad.				Palghat.			
Population	141,641.				47,149.				287,680.				374,703.				292,447.				295,082.			
Total No. of Villages in each Circle.	38.				1.				52.				73.				64.				57.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	...	...	...	...	1	47,149	2	0·04	...	...	...	...	...	...	...	...	...	...	...	...	3	21,295	6	0·2
February	4	16,356	30	1·8	1	47,149	5	0·1	3	12,215	10	0·8	1	3,827	7	1·7	6	23,832	15	0·6	21	129,358	150	1·1
March	5	20,670	61	2·9	1	47,149	24	0·5	3	16,794	8	0·4	2	10,046	13	1·2	7	40,075	16	0·3	30	169,275	226	1·3
April	12	47,159	104	2·2	1	47,149	63	1·3	6	35,322	66	1·8	5	32,054	18	0·5	12	59,965	83	1·3	23	129,385	172	1·3
May	7	30,727	44	1·4	1	47,149	91	1·9	14	89,750	130	1·4	11	73,638	52	0·7	16	78,180	152	1·9	40	217,061	355	1·6
June	6	23,233	26	1·1	1	47,149	84	1·7	17	117,731	186	1·5	25	147,116	197	1·3	19	88,130	298	3·3	46	238,145	903	3·7
July	11	45,360	72	1·5	1	47,149	74	1·5	13	78,359	166	2·1	18	86,271	141	1·6	12	63,110	86	1·3	32	176,399	235	1·3
August	13	52,489	102	1·8	1	47,149	71	1·5	6	40,057	57	1·4	18	100,178	98	0·9	7	36,054	65	1·8	23	123,357	104	0·8
September ...	5	18,031	13	0·7	1	47,149	49	1·04	2	14,546	6	0·4	4	22,166	9	0·4	...	...	...	...	10	59,535	20	0·3
October	...	...	...	...	1	47,149	23	0·4	1	5,127	5	0·9	1	7,870	11	1·4	...	...	...	...	3	16,064	7	0·4
November	1	4,208	1	0·2	1	47,149	1	0·02	1	5,127	1	0·1	...	...	...	...	...	...	...	...	1	8,267	1	0·1
December	...	...	...	...	1	47,149	...	...	...	...	...	...	1	7,726	1	0·1	...	...	...	...	2	16,405	8	0·4
Total ...	16	61,397	453	7·3	1	47,149	487	10·3	23	151,065	635	4·2	25	158,678	542	3·4	30	136,876	715	5·2	52	281,096	2,187	7·7

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Table showing particulars of Cholera Deaths in the different Taluqs and Municipal Towns of the Malabar District during each Month of the Year 1877—(Continued).

Taluqs	M. T. Palghat.				Wynaad.				Cochin				M. T. Cochin.				Anjengo.				Tangacherry.				Total.			
Population	30,689.				125,178.				5,697.				12,815.				...				...				2,253,258.			
Total No. of Villages in each Circle.	1.				16.				3.				1.				...				...				436.			
Months.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.	No. of Villages affected.	Population of affected Villages.	Cholera Deaths.	Ratio per 1,000 of Population.
January	1	30,689	9	0·2	2	17,132	7	0·4	...	...	...	...	1	12,815	1	0·08	1	2,410	6	2·4	...	...	...	...	9	180,990	31	0·2
February	1	30,689	23	0·7	11	79,291	87	1·1	...	...	...	...	...	...	...	...	1	2,410	3	1·2	...	...	...	...	62	438,895	379	0·8
March	1	30,689	35	1·1	13	100,609	184	1·8	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	87	567,811	846	1·4
April	1	30,689	45	1·4	12	87,802	185	2·1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	118	700,123	1,068	1·5
May	1	30,689	76	2·4	12	96,295	102	1·04	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	140	901,094	1,581	1·7
June	1	30,689	55	1·8	4	34,444	24	0·7	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	169	1,000,041	2,317	2·3
July	1	30,689	13	0·4	...	...	...	...	...	...	...	...	1	12,315	2	0·1	...	...	...	...	1	1,562	3	1·9	141	835,944	1,653	1·9
August	1	30,689	39	1·2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	130	948,074	1,278	1·3
September	1	30,689	9	0·2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	60	521,075	467	0·8
October	...	...	...	...	...	...	...	...	...	...	...	...	1	12,815	1	0·08	...	...	...	...	...	...	...	...	31	250,562	196	0·7
November	1	30,689	2	0·06	...	...	...	...	...	...	...	...	1	12,815	1	0·08	...	...	...	...	...	...	...	...	22	209,823	68	0·3
December	1	30,689	1	0·03	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	17	127,489	73	0·5
Total ...	1	30,689	307	10·0	13	100,609	589	5·8	...	...	...	...	1	12,815	5	0·4	1	2,410	9	3·7	1	1,562	3	1·9	255	13,60,317	9,957	3·7

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SMALL-POX.

423. In the past twelve years the registration shows three great epidemic cycles of small-pox culminating in the years 1868, 1873, and 1877. The total of deaths registered in each of those years of maximum prevalence was—

1868	34,330
1873	51,784
1877	88,321 (Famine year).

424. The prevalence and mortality of small-pox in the past year was greater than at any time within my own experience of the country. The condition of the population was such as to be eminently favorable to the spread of a contagious disease like small-pox. Many thousands of the laboring classes wandered away from their homes to the nearest towns or markets or to relief works or camps, so that the people got herded together in large crowds, and at night every resting-place affording shelter was dangerously overcrowded. It was quite remarkable to see the indifference of the people in regard to small-pox. I have seen a man, his body almost nude, and covered from head to foot with small-pox pustules, elbowing his way through a crowd at the distribution of food; I have seen persons also in the midst of crowds in the streets of Madras in the same condition, and in the earlier days of relief-camps it was a common sight to witness women and children in all stages of small-pox, sitting close by others free of the disease, awaiting the distribution of food. To the promiscuous herding and close association of the people in the principal food or labor centres, and to their wandering habits, is, I think, to be attributed the very general distribution of small-pox.

Influence of famine on small-pox.

425. Nearly all historical records of scarcity in India show that small-pox is a most common attendant on those forms of distress that cause disruption of village and family life and tend to the massing of the people in crowds. The indifference of the people to the disease, and their thoughtless exposure of the unprotected to contagion, tend greatly to its epidemic spread. Fortunately, the assemblage of the people in crowds, while it favors the diffusion of small-pox, also presents unusual facilities for the extension of vaccination. In many of our closed relief-camps small-pox was absolutely controlled by vigorous pursuit of vaccination, and thousands of persons who in their own villages would never have seen a vaccinator, made his acquaintance in relief centres to their own immediate and permanent advantage. The seasonal variations in small-pox mortality were less marked in 1877 than usual. As a rule mortality begins to increase in the cold season and attains its maximum in March or April, and declines rapidly during the south-west monsoon months; but in 1877, although the maximum mortality occurred as usual in March, the epidemic, owing to the abnormal condition of the people, did not decline so fast as it usually does.

426. The northern districts, as a rule, did not have much small-pox, and in these districts there being no famine, the people kept to their villages and ordinary occupations. But all the famine districts suffered severely, and in the town of Madras where the ordinary population was increased for months together by starving immigrants, by at least 50 per cent. beyond the census numbers, the small-pox mortality was in the ratio of 17·4 per mille of the ordinary town population. The number of small-pox deaths in the town of Madras was 6,679, which is about one half of the usual mortality in the town from all causes. The special health inspecting establishment, sanctioned by Government in February at my recommendation, found in their house-to-house visitation that nearly every native tenement was full of small-pox cases. Many persons were sent to a special small-pox hospital in the suburbs, but no legal powers existed for clearing infected buildings and treating the sick in hospitals, so that beyond vaccinating the unprotected, where the people were willing to submit to the operation, very little could be done.

427. Of the districts, Chingleput, Tanjore, Salem, Neilgherries, and South Canara suffered most severely from small-pox. Tanjore could hardly be considered a famine district, but about June and July many emigrants from Salem and Coimbatore

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swarmed into the fertile delta of the Cauvery River, and about this time small-pox began to spread amongst the dense population. In South Canara small-pox was very prevalent in the beginning of the year, but declined very much towards the end. This was not a famine district, although wanderers from the country above the ghauts came into it, and the effects here were such as occur in ordinary epidemic seasons.

428. By the end of the year small-pox had almost disappeared as an epidemic from Ganjam, Vizagapatam, Nellore, Madras Town, Madura, Kurnool, Cuddapah, Bellary, Neilgherries, and South Canara. It still prevailed epidemically in Godavery, Kistna, Chingleput, South Arcot, Trichinopoly, Tanjore, North Arcot, Salem, Coimbatore, and Malabar.

429. The returns received in my office are not yet prepared in a form to give the information required in Column 7 of Form VIII of the Standard Statistical Tables, as to the number of deaths of children under 1 year and under 12 years of age from small-pox. To obtain these particulars, Collectors will have to modify their present form of tabulation, and I hope that matters may be arranged so as to show the details required in the report for 1879.

430. The enormous death-rate from small-pox during the past year, equivalent to three per thousand of population against an average of one per thousand in the previous five years, shows very clearly the unprotected condition of the rural population as regards vaccination. I have long been of opinion that compulsory powers are wanted for the due protection of the people, and that those local authorities (Municipalities and Local Fund Boards) who have the machinery at hand for the general practice of vaccination, should be empowered to compel the practice of the operation in their several jurisdictions. Propositions to this effect have been made, and are now under the consideration of Government.

431. In the following table is given the mortality from small-pox in the districts affected by famine at the beginning of the year :—

Famine Districts.	Deaths from Small-pox in 1877.	Ratio to Population.	Mean Ratio of previous 5 years.
1. Kurnool	2,077	2·2	1·0
2. Bellary	4,902	2·9	0·9
3. Cuddapah	4,906	3·6	0·7
4. Nellore	4,466	3·2	0·5
5. Madras	6,679	17·4	1·5
6. North Arcot ...	5,388	2·7	1·5
7. Salem	11,257	5·7	1·5
8. Coimbatore ...	2,366	1·3	0·7
9. Chingleput	5,621	6·01	1·5
10. Madura	3,161	2·3	2·2

432. In the districts below mentioned the scarcity developed into actual famine over partial areas or the whole district during the year :—

Later Famine Districts.	Deaths from Small-pox in 1877.	Ratio to Population.	Mean Ratio of previous 5 years.
1. South Arcot	3,498	1·9	1·7
2. Tinnevelly	2,933	1·7	1·7
3. Neilgherries	327	6·9	0·2
4. Kistna	2,019	1·4	1·1
5. Trichinopoly	5,629	4·6	0·7

433. In the next series of districts the resident populations were unaffected by famine, although some of the districts, as Tanjore, received many emigrants from famine areas. The figures show in what degree they were affected by small-pox :—

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Non-Famine Districts.	Deaths from Small-pox in 1877.	Ratio to Population.	Mean Ratio of previous 5 years.
1. Ganjam	1,646	1·4	0·7
2. Vizagapatam ...	124	0·07	0·5
3. Godavery	888	0·5	1·3
4. Tanjore	11,148	5·6	1·2
5. South Canara ...	7,170	7·8	0·9
6. Malabar	2,116	0·9	1·1

434. These three groups of districts being affected in different degrees by scarcity, the aggregate results of the several groups in regard to the prevalence of small-pox are shewn by the following figures:—

Groups.	Total Population.	Total Deaths from Small-pox.	Ratio.	Mean.
1st Group ...	13,610,813	50,823	3·7	1·2
2nd do. ...	6,147,540	14,406	2·3	1·2
3rd do ...	9,451,189	23,092	2·4	1·4

FEVERS.

435. The registration of deaths in regard to fevers is at all times very unsatisfactory. Ignorant persons who do not understand diseases are very apt to put down everything as fever, especially in those diseases which are attended with high temperature and dry hot skin. But the results of registration in 1877 are very remarkable, showing for the whole Presidency about double the deaths from fever that have occurred in any one of the previous eleven years.

436. All the evidence available goes to show that while the intense heat and drought of the famine period continued there was, if anything, rather a diminished proportion of fever cases throughout the country. The cyclonic storm of the 20th May caused an unusual and excessive rainfall in many districts, but the usual rains of the south-west monsoon held off in a marked degree until the end of August, and fell very freely in September, October and November, causing in many places excessive saturation of the soil after prolonged drought.

437. Malarious fevers began to increase and cause mortality after the heavy rains of the cyclone in May. The total deaths registered from fever in this month was 25,670, and in July the number had risen to 44,366. But the heaviest fever mortality occurred, as it usually does, in the cold season, the deaths in November and December having risen to the extraordinary number of 65,693 (November) and 71,275 (December). The total mortality registered as fever included 469,241 deaths (males 257,866, females 211,375), and the fever death-rate for the whole population was in the ratio of 16·0 per mille against 7·6 per mille, the mean ratio of the preceding five years.

438. But this excessive fever mortality was very unevenly distributed. In some districts the deaths from fever were below the average, and in others very much in excess. To ascertain the causes contributing to the unusual fever mortality it will be necessary to classify the districts according as the results show excessive or ordinary fever mortality:—

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Districts in which the Fever Mortality has not varied much from the average.

Districts.	Death Ratios per Mille, 1877.	Mean of 5 years ending 1876.
1. Ganjam	9·8	9·6
2. Vizagapatam	9·8	10·4
3. Godavery	8·4	9·3
4. Kistna	7·4	7·7
5. Tanjore	2·9	3·1
6. South Canara	6·6	5·3
7. Malabar	7·0	5·9
8. Tinnevelly	6·2	4·3

439. Now it is a very remarkable fact that in these eight districts, the population furnishing death returns being 12,596,884, there should be only 89,434 deaths from fever registered in 1877, giving a mean ratio to population of 7·1 per mille.

440. In only two of these districts, Tinnevelly and Kistna, was there any real famine distress. They all grew enough of food to export largely to the less fortunate parts of the Presidency in the early months of the famine, but towards the end of the year prices were as high in these districts as in any other part of the Presidency, and Tinnevelly depended largely on imported food.

441. We have now to classify the districts in which the registered fever mortality was largely in excess of the average.

Districts showing excessive Fever Mortality in 1877.

Districts.	Death Ratios per Mille, 1877.	Mean of 5 years ending 1876.
1. Nellore	19·3	6·6
2. Madras (Town) ...	15·6	6·4
3. Chingleput	11·2	5·8
4. South Arcot	16·3	6·9
5. Trichinopoly	11·2	7·7
6. Madura	20·6	4·6
7. Kurnool	60·5	13·7
8. Cuddapah	45·6	12·6
9. Bellary	18·3	6·1
10. North Arcot	23·9	10·2
11. Salem	25·5	11·5
12. Coimbatore	12·2	6·7
13. Neilgherries	32·2	11·2

442. These thirteen districts contain a population of 16,612,658 according to the returns received in 1877. In the year 1877, 379,807 deaths from fever were registered in these districts, giving a ratio of 22·9 deaths to one thousand of population. If these results are contrasted with those of the eight districts in which the fever mortality was not unduly high, we shall find that in the first series of districts the fever deaths averaged only 7·1 to population, while in the second series the average mortality was 22·9 per mille.

443. Now the first series of districts was not, except very partially, affected by famine or food-scarcity. Some parts of Tinnevelly undoubtedly suffered for a limited period of the year, and in this district the fever mortality was higher than usual. But in the thirteen districts of the second series the people had suffered greatly from famine distress, and there can be no reasonable doubt that the enfeebled condition of the people caused them to succumb in unusual numbers when malarious fevers attacked them.

444. The physical conditions of the famine districts were such as to produce malaria on a large scale. For two years scarcely any rain had fallen; the solar heat during the earlier months of 1877, according to Mr. Pogson's observations, was

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excessive, the surface soil of thecountry had been unduly heated, and the subsoil water in all parts of the country had receded to a lower level than had ever before been recorded. These unusual soil-conditions were followed in the autumn months of September, October and November by heavy and unusual rains, causing destructive floods in various parts of the country, and complete saturation of the surface soil. Conditions similar to these, viz., long drought, followed by heavy rainfall, have in former times been followed by widespread development of malaria; and in 1866 the districts of Bellary, Kurnool and Cuddapah suffered from an unusual prevalence of fever after the great local drought of 1864 and 1865. In North Arcot, after the great cyclone of 1872 and the excessive rains of that season, the mortality from fever went up exceedingly high. In the famine of Marwar in 1869 Colonel Brooke reported that—

"On the cessation of rains a terrible fever struck down the entire population. * * All the weak and sickly, the old men and half-starved children debilitated by famine, were early carried off. The strong and well-to-do only remained. In some cases half the population died of fever."*

Again in the State of Tonk, during the same famine, we read—

"At the end of the rainy season fever came, which carried off all those whose constitutions had been unable to withstand the privations which all classes had been obliged to endure for a full year. One-fourth of the population in this and the neighboring districts is supposed to have perished during the famine from all causes which concurred to make the year so disastrous."

445. The Madras experience fully bears out that already recorded as to the liability of the people to suffer from fever; not during the time of greatest famine pressure, but after rainfall following on prolonged drought, had set free malarious exhalations from the soil.

446. Kurnool was the worst district for fever, and the heaviest mortality occurred in the month of November, when the food pressure had been very greatly relieved. All classes, even the European and Native supervisors of famine relief, suffered from it. In Cuddapah, where also the highest mortality was reached in November and December, the administration of the district was at one time paralysed by the number of Government officials struck down by fever. In Bellary the fever mortality was not so great as in Kurnool and Cuddapah, but still, more than three times in excess of the average rate. In the North Arcot, Salem and Neilgherry Districts also the fever death-rate was excessive. In the two latter districts it began to increase with the south-west monsoon rains, but in North Arcot the heaviest fever mortality followed the heavy rains of the north-east monsoon.

Type of fever.

447. A question of some interest arises as to the type of fever which in 1877 caused such destruction of life throughout the Madras famine tract. In the Irish famine of 1845-46 it is well known that a relapsing fever—a variety of contagious typhus—caused an appalling loss of life, and this variety of fever has often been spoken of specially as a "famine fever," induced or aggravated by bad living. When the Behar famine occurred in 1874, the Secretary of State for India, at the instigation of the Royal College of Physicians, sent out special instructions for enquiries to be made regarding the prevalence of this much and deservedly dreaded accompaniment of famine, but nothing like a contagious fever was observed in Behar during the progress of the famine of 1874.

448. The late Dr. Graves, of Dublin, who had great experience of famine diseases in Ireland, has recorded an opinion that "relapsing fever" was not a necessary accompaniment of famine, but rather an accidental circumstance in connection with the Irish famine. This form of fever was present in Ireland when the famine distress occurred, and the country-people flocked into the small towns and relief centres to obtain food, just as they did in Madras. In this way every town and relief-work became dangerously crowded, and presented a most favorable opportunity for the development of contagious maladies. The famine-stricken Irish carried this form of fever to all the large manufacturing centres in Scotland and England to which they migrated, and the disease spread in these localities to the well-fed and

* Administrative Experience recorded in former Famine Times. By G. C. Geddes, C.S., Calcutta. Bengal Secretariat Press, 1874, pp. 194 to 197.

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well-to-do people who had not suffered from famine or privation. From a very large experience of famine diseases I quite concur in the opinion expressed by Dr. Graves in regard to relapsing fever that its presence amongst famine-stricken must be regarded as an accidental circumstance, and that there is nothing in the condition of the famine-stricken to develope it anew. And the same remark may be made in regard to cholera and small-pox. Both of these epidemic diseases were prevailing in our famine districts when the food-scarcity began. They were aggravated by the conditions of the famine, viz., the wandering of the people and their crowding on works, in towns, and relief centres, and by the scarcity of water for drinking or ablution; and if a contagious form of fever had existed in the country, it would, from the same causes, have appeared in an aggravated form.

449. I have personally inspected some hundreds of thousands of sufferers from the famine. I have examined with care and attention the sick and helpless in a great number of camps and relief centres, and the result of constant inspection in nearly all the famine districts is that I have not seen any form of fever at all approaching the "relapsing typhus" of the standard authorities.

450. The fever which has been so destructive to the people is nothing more than the ordinary malarious ague. With the strong and well-to-do it has occasioned very little mortality, but with the weakly and half-starved victims of the famine it has been very fatal.

451. Surgeon Sturmer, the Sanitary Inspecting Officer of the Nellore District, in the course of his village inspections, heard rumours of a fatal type of fever which from the description given to him appeared to be of a "continued" and not intermittent variety.

452. He, at my suggestion, made numerous endeavors to see a case of this description of fever, but was unsuccessful in meeting with a single specimen. This fever was described as ending in dropsy after some days, but as the same result followed on ordinary ague in the famine-stricken of the camp hospitals of the district, I could only come to the conclusion that no form of "continued" fever had prevailed, and that the ordinary ague symptoms might have been modified in some of the victims of the famine. There can be no doubt that in the cold months of the year the weakly survivors of the famine were often rapidly cut off by fever, in some cases complicated with pneumonia or congestion of the lungs.

453. The relation of the fever mortality to the famine appears to have been this, that a vast number of people had been so debilitated by want that they had no reserve of vital force to enable them to withstand a disease which, in ordinary years, is not very fatal in proportion to the number of sufferers. The feeble health and depraved condition of body amongst the poor, induced by long privation, were undoubtedly the circumstances predisposing to the large mortality from fever. It seems very probable also that in the famine area many deaths were ascribed to "fever" which would more appropriately have been registered as due to privation.

454. For all practical purposes in dealing with a population affected by famine an unusual mortality from fever, as shown in the Rajputana famine, is a thing to be looked for amongst the feeble and debilitated sufferers from insufficient food. Had there been no famine, no prolonged drought followed by unusual saturation of soil, it is quite fair to assume that the area over which distress prevailed would not have shown a larger proportion of fever deaths than the seven districts in which food dearth did not prevail.

BOWEL-COMPLAINTS.

455. There has been some misapprehension on the part of the Army Sanitary Commission in thinking that cholera is commonly included under the heading "Bowel-complaints." A Medical Officer in Malabar, when cholera invaded the district in 1875, owing to the absence of certain usual symptoms of the disease, gave as his opinion, that the disease resembled an ordinary diarrhœa more than cholera; but this individual opinion, which was not concurred in by the revenue officials and those responsible for the registration of the causes of death, had no

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effect on the registration. In that year 3,633 deaths were registered from cholera and 4,299 from "bowel-complaints" in the Malabar District. In the Municipal town of Calicut, where the Medical Officer's opinion might have influenced the registration to some extent, the cholera deaths were stated as 112, and the bowel-complaints as 79. The distinction between cholera and other fluxes from the bowels is generally understood by even ignorant persons, but owing to faulty translation into the vernaculars of the names of diseases included under the general classification of "bowel-complaints," I find that in some districts it has been the practice to include only diseases of indigestion, colic, &c., omitting the more important disease of dysentery, which, in some instances, has been relegated to the heading "other diseases." Attempts have been made in the past year to make the classification in this respect more accurate, but the results are not yet so apparent as they should be. The peculiar diarrhœa of famine during the last year was often confounded with and registered as "cholera."

456. The famine distress in itself is sufficient to account for the great increase of mortality under this head. The total registered deaths from bowel-complaints were 133,366, the mean of the previous five years being 37,886. In the town of Madras where, owing to the number of hospitals, permanent and temporary, for the relief of famine suffering, the registration was on the whole fairly accurate, the proportion of deaths to ordinary population from bowel diseases was 38·2 per mille. For the whole of the Presidency the death-rate had increased from 1·3, the average of the previous five years, to 4·5 per mille in 1877. But even this large increase does not at all represent the actual mortality from that most fatal of all affections "famine-diarrhœa." The registration in this particular has been very faulty in Salem, Cuddapah, and South Arcot of the famine districts; fortunately the returns of deaths in the famine relief-camps of the several districts are available to show how defective the annual registration has been as regards the classification of the causes of death.

Mortality in famine camps.

457. In all our famine relief-camps and hospitals, the most common termination of life was bowel-flux, either dysenteric in character or diarrhœal. Probably of the 82,993 persons known to have died while in *camps,** three-fourths of the whole number had some bowel affection, either at the time of death or preceding. Indeed a healthy evacuation of the bowels was the exception, and fluxes the rule, in all who had undergone a certain degree of starvation. In chronic starvation there is a gradual waste of the tissues of the body. First of all the fat disappears, then the glandular structures shrink and muscles waste, and the special anatomical structures engaged in the absorption of nutriment from food cease their functions, and disappear in the general waste. When the degeneration of the lacteals has progressed so far as to impair their functions, recovery is hopeless. Whatever food may be swallowed is passed, for the most part, undigested, and the various tissues of the body receive little or no nutriment. Diarrhœa and dropsy of the whole body are the usual endings of four-fifths of the famine-stricken, but in many cases the texture of the mucous membrane of the bowels is not only wasted, but inflamed and ulcerated as in chronic dysentery.

458. In the non-famine districts the number and proportion of deaths registered from bowel-complaints were as follows:—

Non-Famine Districts.	Number of Deaths.	Ratio per Mille.	Mean Ratio of 5 years.
1. Ganjam	344	0·2	0·5
2. Vizagapatam ...	616	0·3	0·3
3. Godavery	756	0·5	0·5
4. Kistna	549	0·3	0·4
5. Tanjore	2,629	1·3	1·0
6. South Canara ...	5,111	5·5	3·5
7. Malabar	5,329	2·3	2·7

* This number is not strictly accurate. Many camps, when first organised, failed to furnish returns of strength and mortality. These figures refer only to the returns actually received in my office.

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In the famine districts the following results are shown:—

Famine Districts.	Number of Deaths.	Ratio per Mille.	Mean Ratio of 5 years.
1. Nellore	1,758	1·2	0·5
2. Madras	14,605	38·2	5·0
3. Chingleput	15,082	16·1	2·2
4. South Arcot ...	2,987	1·7	0·9
5. Trichinopoly ...	3,996	3·3	1·2
6. Madura	9,035	6·8	1·1
7. Tinnevelly	9,777	5·7	3·8
8. Kurnool	6,646	7·2	0·5
9. Cuddapah	7,986	5·9	0·6
10. Bellary	13,463	8·0	1·1
11. North Arcot ...	9,703	5·0	1·1
12. Salem	9,547	4·8	0·9
13. Coimbatore	12,871	7·3	1·6
14. Neilgherries ...	576	12·1	2·4

459. From these tables we see that seven non-famine districts, with a population of 10,903,255, registered 15,334 deaths from bowel-complaints, or in the ratio of 1·4 per mille, while the fourteen districts influenced by famine, with a population of 18,306,287 had 118,032 deaths from bowel diseases, or in the proportion of 6·4 per mille of population.

460. But, as already stated, although the proportion of registered bowel disease in the famine districts is vastly greater than that of the non-famine districts, the true rate of mortality from famine-diarrhœa is not adequately represented by the district registers.

461. We have not the means of recording the actual cause of death in the various famine relief-camps, but according to my experience, and judging from the weekly returns received in my office, about three-fourths of the whole deaths would fall to be registered under famine-dysentery or diarrhœa.

462. The total registered deaths from bowel-complaints and of deaths in relief-camps in the several districts are contrasted below:—

Table of Bowel-complaints registered in Districts and Mortality in Relief Camps.

Districts.	Registered Deaths from Bowel-complaints in whole District.	Total Deaths in Relief-camps.
1. Madras	14,605	8,228
2. Nellore	1,758	7,609
3. Chingleput	15,082	5,352
4. South Arcot ...	2,987	2,626
5. Madura	9,035	7,003
6. Tinnevelly	9,777	1,344
7. Kurnool	6,646	3,250
8. Cuddapah	7,986	10,624
9. Bellary	13,463	6,173
10. North Arcot ...	9,703	10,815
11. Salem	9,547	14,500
12. Coimbatore	12,871	5,469
Total ...	113,460	82,993

463. The returns from Nellore would appear to be singularly defective, as the whole district registers but 1,758 deaths from bowel-complaints, while there actually died in relief-camps 7,609 persons, of whom if only one-half had died of bowel-complaints the registration total would have been 3,800 instead of 1,758, without taking into account the large numbers who died in their own villages. The who returns of deaths in this district were in fact very imperfect.

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INJURIES.

464. The total number of deaths registered from accidental or violent causes was 16,460 (males 9,147, females 7,313). This number is in excess of the accidental death-registration of any previous year, as will be seen from the following table: —

Deaths from Injuries compared with previous years.

Years.	Suicides.	Wounding.	Accidents.	Snake-bite and killed by Wild Beasts.	Total.
1866	623	...	6,216	2,208	9,047
1867	615	...	5,853	2,145	8,613
1868	602	...	6,007	2,633	9,242
1869	694	...	6,057	2,559	9,310
1870	1,438	...	8,158	2,729	12,325
1871	2,370	1,093	8,473	3,387	15,323
1872	2,366	944	8,724	3,116	15,150
1873	2,077	918	8,267	2,989	14,251
1874	1,876	828	7,762	2,599	13,065
1875	1,811	880	7,177	2,553	12,421
1876	1,715	896	6,187	2,377	11,175
1877	2,575	1,372	10,425	2,088	16,460

Suicides.

465. The number of suicides was considerably in excess of the average of the previous five years, viz., 2,575, against an average of 1,969. A year of famine is a period of mental distress and despair to many thousands, and it is no cause for surprise that suicides should be more frequent at such a time.

Accidental deaths.

466. The deaths from accident too are largely in excess of the average. In the town of Madras, where the grain traffic was so enormous, a rather singular form of accident added very largely to the deaths by violence. Nearly all the rice brought by sea was removed to the Railway Goods Station, nearly two miles distant, by carts drawn by men, and very frequently the wheels of heavily-laden carts caught the naked heels of the pullers. This crushing of the heel generally led to great sloughing of the parts and constitutional disturbance, and not unfrequently tetanus supervened. In the Madras General Hospital at one time two or three temporary hospital sheds were quite filled with patients who had had their heels crushed by rice-laden carts. In the course of the year 1,066 persons in the town died from accidental injuries, the ratio to population of deaths from injuries being 2·8 per mille.

467. In the year 1875, before this abnormal grain traffic set in, the ratio was only 0·4 per mille.

Snake-bite and wild beasts.

468. From snake-bite and wild beasts the deaths in 1877 were 2,088, the average for the previous five years being 2,727. Under this heading there was a decided decrease in the registered mortality, but the decrease is probably a nominal one, considering how large a proportion of the population for some months in the year were non-resident in their own villages, and thus removed from the observation of the village servants who register deaths.

OTHER CAUSES.

469. The deaths registered under the heading "Other causes" were 491,494, or more than double the average under this general head of classification. The excess was no doubt very largely made up of famine diseases, as indeed may be shown by the number and proportion of deaths under this heading in the non-famine and famine areas.

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Non-Famine Districts.	Deaths from "All other Causes."	Proportion to Population per Mille.
1. Ganjam	2,760	2·3
2. Vizagapatam	4,221	2·7
3. Godavery	10,336	6·5
4. Kistna	10,087	6·9
5. Tanjore	40,300	20·4
6. South Canara	8,997	9·8
7. Malabar	15,596	6·9

Famine Districts.	Deaths from "All other Causes."	Ratio per Mille.
1. Nellore	12,832	9·3
2. Madras	11,031	28·8
3. Chingleput	25,161	26·9
4. South Arcot	34,399	19·5
5. Trichinopoly	27,572	22·9
6. Madura	23,258	17·5
7. Tinnevelly	30,224	17·8
8. Kurnool	10,763	11·7
9. Cuddapah	11,316	8·3
10. Bellary	74,250	44·5
11. North Arcot	54,588	28·2
12. Salem	57,532	29·2
13. Coimbatore	25,770	14·6
14. Neilgherries	501	10·5

470. The seven non-famine districts, with a population of 10,903,255, return 92,297 deaths from "all other causes," or in the proportion of 8·5 per mille; while the fourteen distressed districts, with a population of 18,306,287, return 399,197 deaths under this heading, or in the proportion of 21·8 per mille of population.

471. But an analysis of the returns brings out some curious anomalies, showing that the system of death classification varies in different districts. Thus, for instance, in the area known as the "Ceded Districts" comprising Bellary, Cuddapah and Kurnool, the two latter districts return but a small proportion of mortality from "other causes," but a very high ratio of mortality from "fevers," whereas Bellary returns only about one-half the proportion of deaths from "fevers" of the other districts, and a very high average from "other causes." Practically this analysis shows that the classification of the causes of death in famine times especially cannot be regarded as accurate.

Deaths from privation.

I have no means of knowing how many deaths were returned by the village registrars as due "to starvation," as the details of diseases included under "all other causes" are only seen by the mortuary clerks in Collectors' Offices. I apprehend, however, that the effect of standing orders, that no person is to be permitted to die for want of food, would to a great extent prevent any such entries in the village registers, and that the great bulk of the famine mortality has been included under 'cholera,' 'fevers,' 'bowel-complaints,' and the general heading 'all other causes.'

Definition of starvation.

472. The distinction between chronic and acute starvation, if I may judge from current famine literature, is not recognized, even at the present time, after all our long and dreadful experience of the past year. A very common notion still prevails that so long as a person has food to swallow he cannot be said to die of "starvation," and those who countenance such a theory quite forget that as a fact, hundreds of thousands in the past year have been mortality-stricken from prolonged insufficiency of food, long before they came under the supervision of the administrators of famine-relief. There are two varieties of starvation recognized by all physiologists and practical physicians. The "acute" form, in which all food and drink is withheld, as in people shipwrecked at sea, or shut up in mines; and the "chronic" form, in which the daily

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nutriment necessary to the wants of the body is defective in quantity or quality. The "acute" form of starvation slays its units; the "chronic" form its tens of thousands. It is the latter form that we have to take notice of in seasons of dearth and food-scarcity, but of late years a fashion has sprung up of referring mortality that unquestionably ought to be shown under the head of "privation" or "starvation" as due to disease, and in this way attention is diverted from the real fount and origin of excessive death-rates. In my judgment it is greatly to be deplored that the exact truth in regard to the effect of diminished food-supplies on a population cannot be shown in the death-registration tables. But this is quite impracticable at present, owing to the ignorance of the class of persons who furnish the particular causes of death. The diseases of innutrition, however well known to persons of medical training, cannot be specified by uneducated village servants, and the fear of getting into trouble with the authorities would further have the effect of making these servants record mortality as due to "old age," "fever," or any other head of classification, rather than to the proper heading "chronic starvation."

473. But setting aside altogether the question of the classification of the causes of death, there remains the broad and indisputable fact that in the year 1877 we have actually registered 1,556,312 deaths, while the average annual registration of the previous ten years was only 497,474. This enormous increase of mortality has followed very closely the severity of the famine distress in various parts of the country, and the connection between the increased death-rate and intensity of famine is shown not only in the results of particular registration circles, but the recent trial census of selected famine areas made on 14th March 1878, abundantly testifies to the serious losses sustained by the population during the past year of prolonged distress.

474. Under whatever head the mortality may have been registered, the analysis of the returns show that famine, and famine alone, either directly or indirectly, has been answerable for the unusual mortality recorded by the village registrars for the year 1877. Great as the increased mortality, as shown by the registers, is, it must be remembered that the registration, from causes connected with the famine, was more imperfect than usual, and that the figures represent only *relative* and not *absolute* mortality.

SECTION VII.

SANITARY WORKS—MILITARY.

475. For this section of the report it is proposed to make use of the cantonment sanitary reports, these being the only data before the Sanitary Commissioner regarding the sanitary improvements effected or in progress during the year in each of the military cantonments.

476. I have to remark that the cantonment reports are drawn up in a very perfunctory manner, and the information they contain is very meagre. It is suggested that the attention of Cantonment Committees and Officers commanding stations be called to the importance of these reports, as they are the only documents from which the Sanitary Commissioner is enabled to gather his information regarding the condition of, and the sanitary progress made, in each military station.

477. The following is an abstract of notes of the sanitary works in each station arranged alphabetically. The headings are the same as those of last year.

478. The sickness and mortality of the troops at each station are omitted, as they are given elsewhere in another section of the report.

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Bangalore.

Drainage ...	Good.
Water-supply ...	Good.
Barrack accommodation.	Ample.
Epidemics ...	Cholera, small-pox, and famine diseases were prevalent. The two former diseases occurred among the troops also. There were 5 cases of cholera with 3 deaths among the European, and 9 cases with 5 deaths among the Native troops; and from small-pox there were 1 and 12 cases respectively, with no deaths.
Conservancy and sanitary condition.	Conservancy of latrines fair, on the dry-earth system. Sewage removed to a distance and buried. The sanitary condition of the station and bazaar was fairly good, but the influx of large crowds of famine-stricken people from the surrounding countries greatly interfered with the sanitary arrangements of the station.
Prices of food and meteorology.	Climate on the whole fair. Prices of food very high. Rainfall more than average, viz., 39 inches against 34 the average.
Cantonment rules ...	In force. 107 women on the register. Venereal disease milder in form. Extra police required as a detective agency, and the Act should be extended to all women who ply the trade of prostitution. The rules, as they now stand, affect only women who consort with Europeans.
Suggestions for sanitary improvements.	Bazaars should be built in a more regular manner with well arranged latrines, and the new water-supply scheme should be completed. The east hutting lines should be rebuilt, or, if possible, the regiment should be removed to another site.
Sanitary works ...	Pucka drains to the extent of 10,371 feet were constructed; 41 new wells were sunk, and several other wells, reservoirs, and tanks were cleared out and deepened, and 3 latrines built.

Bellary.

Drainage ...	Surface drainage needing improvements, but want of funds has been an obstacle.
Water-supply ...	Good; from fort moat and wells. The drought of 1876 caused a deficiency in quantity for some time, but rain having subsequently fallen, improved matters somewhat.
Barrack accommodation.	Ample.
Epidemics ...	Cholera and small-pox prevailed throughout the greater part of the year, and fevers and bowel-complaints towards the end. The Native community suffered considerably from these causes. Two cases of cholera occurred among the European troops with no deaths, and among the Native troops 12 cases and 7 deaths. The year was one of great distress and anxiety owing to severe famine throughout the district. There was a good rainfall at the latter end of the year, the famine relief-camps were gradually closed, and the state of the crops was reported to be generally good.
Conservancy and sanitary condition.	Latrines and bazaars are in fair sanitary condition, attended to by the Municipality. There are 23 public latrines, 1 to every 2,100 inhabitants. Dry-earth system of conservancy is adopted. Night-soil of private houses is carried away by Municipal carts.
Prices of food and meteorology.	Food-supplies were scarce and prices high, but at the end of the year, with a good rainfall, prices fell, when rice and cholum sold at 16 lb. the rupee and ragi 21 lb. The rainfall amounted to 26·5 inches, against an average of 17 inches. This abundance of rain, however, gave rise to fevers, bowel and catarrhal affections towards the end of the year.
Cantonment rules ...	Increase of venereal diseases among the European troops. Famine refugees from the district flocked into the town, eking out a livelihood by prostitution. Segregation and compulsory residence of registered prostitutes within defined limits has been recommended.
Suggestions ...	Cleansing of the bed of the fort rock reservoir of silt.
Sanitary works ...	None of importance, beyond opening and cleansing of the old drains.

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Berhampore.

Drainage ...	Fair; requires improvement.
Water-supply ...	From wells and tanks, of doubtful quality.
Barrack accommodation.	No European troops.
Epidemics ...	Cholera broke out in the Regimental Lines, and prevailed also largely among the civil population.
Conservancy and sanitary condition.	Condition of latrines and bazaars satisfactory; dry-earth system of conservancy.
Prices of food and meteorology.	Prices of food high. Climate conducive to health. Rainfall 40 inches against an average of 45.
Cantonment rules ...	Not in force.
Suggestions for sanitary improvements.	None.
Sanitary works ...	A latrine was newly built.

Calicut.

Drainage ...	Surface drainage; good.
Water-supply ...	From wells; quality good.
Barrack accommodation.	Ample.
Epidemics ...	None.
Conservancy and sanitary condition.	Sanitary condition of latrines good, but that of the town bazaar unsatisfactory. No public latrines. Dry-earth system adopted in hospitals only. Night-soil and refuse is thrown into the sea.
Prices of food and meteorology.	Prices of food high, rice being sold at 5 measures the rupee. Climate favorable to health.
Cantonment rules ...	Not in force.
Suggestions for sanitary improvements.	None.
Sanitary works ...	A new drain was built and the others cleaned.

Cannanore.

Drainage ...	Surface drainage satisfactory, and for the most part natural.
Water-supply ...	Good, from wells.
Barrack accommodation.	Sufficient.
Epidemics ...	Cholera, and slight prevalence of small-pox. None among the troops.
Conservancy and sanitary condition.	Of latrines and bazaars satisfactory. Dry-earth system. Public latrines 1 to every 1,500 inhabitants. Sewage is buried inland.
Prices of food and meteorology.	Prices of food moderate. Climate unhealthy, owing to excessive rainfall in September and October; 120 inches.
Cantonment rules ...	Apparent decrease of venereal diseases: 36 women on the register.
Suggestions for sanitary improvements.	None.
Sanitary works ...	Two culverts were constructed, the roofs of latrines, cholera sheds, offal and night-soil pits were re-thatched. Roads, tanks, and drains were repaired and cleaned, and 150 avenue trees planted.

Chandah.

Drainage ...	Good.
Water-supply ...	Good.
Barrack accommodation.	No European troops.
Epidemics ...	None.
Conservancy and sanitary condition.	Fair. Latrines kept in good order. Dry-earth system of conservancy. Sewage is disposed of in trenches made for the purpose.
Prices of food and meteorology.	No scarcity of food, but prices somewhat high. Rainfall 35·5 inches against an average of 44.

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Cantonment rules ...	Not in force.
Suggestions for sanitary improvements.	None.
Sanitary works ...	Rank vegetation and low brushwood removed.

Cuttack.

Drainage ...	Very bad. Removal of the lines to another site recommended.
Water-supply ...	Good, from wells.
Barrack accommodation.	No European troops.
Epidemics ...	Small-pox early in the year, and occasional prevalence of cholera among civil population.
Conservancy and sanitary condition.	Fair. No public latrines.
Prices of food and meteorology.	Deficient rainfall. Only 38·2 inches against an average of 60·6 inches. Partial failure of rice crops, and large exportations to Madras enhanced the prices of food.
Cantonment rules ...	Not in force.
Suggestions for sanitary improvements.	None.
Sanitary works ...	None.

French Rocks.

Drainage ...	Fairly good.
Water-supply ...	Good, principally from wells.
Barrack accommodation.	No European troops.
Epidemics ...	Cholera prevailed among the troops and civil population. Of the former 10 were attacked and 5 died. Among camp-followers there were 48 cases and 34 deaths.
Conservancy and sanitary condition.	Satisfactory. Dry-earth system of conservancy. Night-soil removed daily and used for cultivation.
Prices of food and meteorology.	Prices of food very high. Rice 11 lb. per rupee, ragi 14 lb. Rainfall deficient.
Cantonment rules ..	Not in force.
Suggestions for sanitary improvements.	Construction of V-shaped drains in Native Infantry Lines.
Sanitary works ...	None.

Hooshungabad.

Drainage ...	None properly so called.
Water-supply ...	Good, from wells.
Barrack accommodation.	No European troops.
Epidemics ...	None.
Conservancy and sanitary condition.	Condition of latrines and bazaars tolerably good. Sewage removed daily in carts. Dry-earth system of conservancy adopted in hospital.
Prices of food and meteorology.	Not known; no records kept.
Cantonment rules ...	Not in force.
Suggestions for sanitary improvements.	None.
Sanitary works ...	None.

Kamptee.

Drainage ...	Good.
Water-supply ...	Good and abundant from wells.
Barrack accommodation.	Ample.
Epidemics ...	None worth mentioning; 3 or 4 isolated cases of cholera occurred in the bazaar, all of which recovered.

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Conservancy and sanitary condition.	Condition of latrines and bazaars tolerably good. The latter have been considerably improved since the flood of September 1876. There are 60 public latrines, 16 with tiled roofs.
Prices of food and meteorology.	Prices of food moderate. Climate conducive to health; but there was a deficiency of rainfall, 42 inches against an average of 58.
Cantonment rules ...	Diminution of venereal diseases, and milder in character. 74 prostitutes on the register.
Suggestions for sanitary improvements.	Open saucer masonry drains are much needed in the bazaars. Latrines should be thatch-roofed to better carry out the dry-earth system of conservancy, and placed under the Police.
Sanitary works ...	Roads, tanks, and wells were repaired and cleaned at a cost of 15,000 Rupees. A new well was completed and new roads are under formation.

Madras (Fort Saint George).

Drainage ...	Of the fort satisfactory; of the town still unsatisfactory.
Water-supply ...	In the fort from the Seven Wells, of good quality. In the town the civil population principally use the Red Hills water, which was very bad until May, and improved in quantity and quality after the abnormal rain in May and the ample fall at the end of the year.
Barrack accommodation.	Ample.
Epidemics ...	Cholera, small-pox, and diseases incident to starvation affected the civil population of the town considerably. Among the troops there were 4 cases and 3 deaths from cholera, but the disease did not prevail epidemically in the fort.
Conservancy and sanitary condition.	Sanitary condition of latrines good, and that of the bazaars and town fairly satisfactory; but the influx of enormous crowds of famine-stricken people from the adjacent countries very much impeded the general sanitary arrangements of the town.
Prices of food and meteorology.	Prices of food very high throughout the greater part of the year; at the latter end they fell somewhat. Abundant rain fell during the year, 66·2 against 21·6 in 1876 and a five years' average of 63·8 inches. There was an abnormal fall of 21 inches from the 17th to 20th of May.
Cantonment rules ...	Working of the Contagious Diseases Act unsatisfactory. There was an increase of venereal diseases among the European troops, attributed more to the large influx of strange women who flocked into the town owing to the famine, than to defects in the working of the rules.
Suggestions for sanitary improvements.	A good system of drainage much needed in the town.
Sanitary works ...	During the famine, when the health and sanitary condition of the town was much affected, a special sanitary department was organized under a temporary Health Officer, which did much to improve the sanitation of the town and check the progress of the epidemics that then prevailed.

Malliapooram.

Drainage ...	Very good, from the formation of the ground.
Water-supply ...	Good, from wells.
Barrack accommodation.	Sufficient.
Epidemics ...	Cholera and small-pox prevailed among the civil population; the latter disease rather severely. None among the troops.
Conservancy and sanitary condition.	Fair. Dry-earth system adopted in the hospital only. Sewage is buried.
Prices of food and meteorology.	Prices of food high. Rice 5½ measures per rupee. Rainfall ample; 102·1 inches against 71·8 in 1876.
Cantonment rules ...	Not in force.
Suggestions for sanitary improvements.	A well much needed in hospital compound.
Sanitary works ...	None.

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Mangalore.

Drainage ...	Satisfactory.
Water-supply ...	Good, from wells.
Barrack accommodation.	No European troops.
Epidemics ...	Small-pox and cholera prevailed to a slight extent. The former disease prevailed among the troops also; 9 men and 20 followers were attacked, 3 of the latter having died.
Conservancy and sanitary condition.	Good. Dry-earth system adopted. Refuse from the lines is carted away daily, but no arrangements are made for the disposal of the sewage from private houses. Most of the houses have garden lands attached.
Prices of food and meteorology.	Prices of food high owing to exportation to famine districts. Rainfall a little more than the average; 131 inches against an average of 130.
Cantonment rules ...	Not in force.
Suggestions for sanitary improvements.	None.
Sanitary works ...	None.

Mercara.

Drainage ...	No regular drains in existence. The natural drainage fairly good.
Water-supply ...	Of good quality from wells.
Barrack accommodation.	No European troops.
Epidemics ...	Cholera to a large extent among civil population; none among the troops.
Conservancy and sanitary condition.	Conservancy fair, on the dry-earth system. A bad arrangement exists of allowing the house slops to soak into the ground, there being no regularly built drains. In the monsoon the accumulated filth is washed away.
Prices of food and meteorology.	Prices of food moderate. Climate generally healthy. Rainfall below the average; 112·2 inches against an average of 149.
Cantonment rules ...	Not in force.
Suggestions for sanitary improvements.	Good well-made drains are very much needed.
Sanitary works ...	Two new latrines were built during the year.

Moulmein.

Drainage ...	Generally good, but in some parts bad and requires improvement.
Water-supply ...	Sufficient in quantity and good in quality.
Barrack accommodation.	Ample.
Epidemics ...	Cholera among the civil population.
Conservancy and sanitary condition.	Conservancy good, on the dry-earth system. The sanitary state of the bazaars is as well as it could be kept, considering the crowded state of the village, in which there are no roads.
Prices of food and meteorology.	Prices of food moderate, but higher than in former years. Rainfall 176 inches, being below the average.
Cantonment rules ...	Not in force.
Suggestions for sanitary improvements.	The village of Mandalay should be entirely removed. It is bad in every respect, situated as it is in a marsh, and interferes with the free ventilation of the cantonment.
Sanitary works ...	The Officer commanding the station has no power with reference to sanitary progress, and consequently much has not been done.

Mysore.

Drainage ...	Fair, requires improvements, which are being carried out.
Water-supply ...	Good, from tanks and wells.
Barrack accommodation.	No European troops.
Epidemics ...	Cholera, bowel diseases, and fevers among civil population.

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Conservancy and sanitary condition.	Conservancy of barracks good, on the dry-earth system, and the sanitary state of bazaars fair. Public sewage is removed by Municipal carts. In private houses cess-pools exist which are seldom or ever cleared out. The overflow from these and from working places finds its way into the street drains.
Prices of food and meteorology.	Prices of food very high. The famine during the year affected the public health considerably. The early rains failed, but towards the end of the year abundant rain fell, and did immense good. The total amount gauged was 31·6 inches against an average of 28·9.
Cantonment rules ...	Not in force.
Suggestions for sanitary improvements.	None.
Sanitary works ...	Improvements in drainage are being carried out; a large extent of V-shaped drains has been laid down. A large tank was proceeded with by means of famine labor, and other minor improvements were made.

Palamcottah.

Drainage ...	Fairly good, but requires improvement.
Water-supply ...	Good, from tanks and wells.
Barrack accommodation.	No European troops.
Epidemics ...	Cholera among the civil population; 2 cases occurred in the Regimental Lines.
Conservancy and sanitary condition.	Conservancy fair, on the dry-earth system. Sewage is carted by Municipal authorities and used as manure.
Prices of food and meteorology.	Climate generally healthy; prices of food very high owing to the failure of crops from want of rain. In December, however, rain fell abundantly and did much good.
Cantonment rules ...	Not in force.
Suggestions for sanitary improvements.	A better system of drainage required.
Sanitary works ...	None.

Palaveram.

Drainage ...	Satisfactory.
Water-supply ...	Good, from covered wells.
Barrack accommodation.	Ample.
Epidemics ...	None; but a good deal of cholera in the neighborhood.
Conservancy and sanitary condition.	Conservancy good, on the dry-earth system. Sewage chiefly carried off into main drains.
Prices of food and meteorology.	Prices of food very high. Climate generally healthy. Rainfall above the average.
Cantonment rules ...	In force. Nothing of importance to note.
Suggestions for sanitary improvements.	None.
Sanitary works ...	Drains, &c., were kept clean.

Poonamallee.

Drainage ...	Good.
Water-supply ...	Good, from wells.
Barrack accommodation.	Ample.
Epidemics ...	Cholera; 3 cases occurred among the troops and their families, of which 2 died—a man and a woman. Cholera very prevalent in surrounding country.
Conservancy and sanitary condition.	Satisfactory, on the dry-earth system. Sewage is buried at a distance. There are 4 public privies, 1 to every 1,000 inhabitants.
Prices of food and meteorology.	Climate unhealthy. Prices of food at famine rates. Failure of early rains; at the end of the year abundant.

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Cantonment rules ... In force. 18 women on the register.
Suggestions for sanitary improvements. None.
Sanitary works ... Two new wells were dug.

Port Blair.

Drainage ... Good in some parts and indifferent in others; requiring improvement.
Water-supply ... Good, from wells and tanks.
Barrack accommodation. Ample.
Epidemics ... None.
Conservancy and sanitary condition. Fair. Dry-earth system imperfectly carried out. Sewage is thrown into the sea. Sanitary state of bazaars good.
Prices of food and meteorology. Climate healthy. Food is imported and sold at moderate rates. Rainfall 114·8 against an average of 115 inches.
Cantonment rules ... Not in force.
Suggestions for sanitary improvements. None.
Sanitary works ... Permanent drains are being gradually laid down; 4 wells were sunk and other minor sanitary improvements effected.

Quilon.

Drainage ... No regular drains.
Water-supply ... Of good quality, from wells.
Barrack accommodation. No European troops.
Epidemics ... Cholera and small-pox among the civil population. Three cases of cholera occurred in the regiment and 4 among the families; one man died.
Conservancy and sanitary condition. Good on the whole. Sewage carted away and buried at a distance.
Prices of food and meteorology. Prices of food very high. Failure of early rains; at the end of the year abundant, quantity registered 121 inches against an average of 91.
Cantonment rules ... Not in force.
Suggestions for sanitary improvements. None.
Sanitary works ... None.

Rangoon.

Drainage ... Satisfactory.
Water-supply ... From wells, of fair quality.
Barrack accommodation. Ample.
Epidemics ... Cholera prevailed slightly. A few cases occurred in the cantonment.
Conservancy and sanitary condition. On the whole good. Dry-earth system adopted. The excreta from private houses is removed by the Municipality and used for agricultural purposes. There are 11 public latrines, 2 to every 1,000 inhabitants.
Prices of food and meteorology. Climate generally healthy. Prices of food rather high owing to large exportations to Madras. The rains, though late, fell abundantly, 102·6 inches against an average of 78 inches.
Cantonment rules ... In force. 466 women on the register. The rules do not appear to have worked satisfactorily, as venereal diseases caused a large amount of inefficiency amongst the troops during the year.
Suggestions for sanitary improvements. None.
Sanitary works ... Nothing of importance.

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Ramandroog.

Drainage ...	Satisfactory.
Water-supply ...	Very good, from springs in the side of the hill.
Barrack accommodation.	Ample.
Epidemics ...	None.
Conservancy and sanitary condition.	Conservancy of cantonment good, on the dry-earth system; but the sanitary condition of the bazaars and village defective. There are no public privies.
Prices of food and meteorology.	Climate generally healthy. Prices of food high. Rainfall abundant, 41·9 inches, being 26 inches more than in 1876.
Cantonment rules ...	Not in force.
Suggestions for sanitary improvements.	Native village should be put into good sanitary condition. At present there is no sanitation at all.
Sanitary works ...	Open surface drains were cleaned out and others improved and extended.

Raepore.

Drainage ...	Good on the whole; principally surface drainage.
Water-supply ...	Good, from wells.
Barrack accommodation.	No European troops.
Epidemics ...	Cholera among the civil population. Six cases occurred in the cantonment, with 1 death.
Conservancy and sanitary condition.	Conservancy good, on the dry-earth system. Sewage from private houses buried in pits in the grounds adjoining; that from the lines removed and buried at a distance.
Prices of food and meteorology.	Climate generally healthy and food abundant.
Cantonment rules ...	Not in force.
Suggestions for sanitary improvements.	A low lying piece of ground near the regimental hospital requires to be further drained, and a large tank near the cemetery needs clearing of weeds very much.
Sanitary works ...	None.

Saint Thomas' Mount.

Drainage ...	Satisfactory.
Water-supply ...	Obtained from wells, and is generally good.
Barrack accommodation.	Ample.
Epidemics ...	Cholera prevailed largely among the civil population. One case occurred in a European soldier.
Conservancy and sanitary condition.	Conservancy fair, on the dry-earth system. Sewage of private houses is disposed of by private arrangements and conservancy carts. There are 13 public latrines, 1 to every 1,175 persons.
Prices of food and meteorology.	Prices of food very high; a year of exceptionally high mortality owing to famine. The European troops suffered chiefly from typhoid fever, venereal and hepatic diseases. Rainfall at the end of the year abundant, 69·7 inches against 16·5 in 1876.
Cantonment rules ...	In force. 32 women on the register. The rules do not appear to have worked so satisfactorily during the year as in former years. They are good, but it is difficult to control clandestine prostitution. The failure should be considered as exceptional. The difficulties arose more from the large influx of starving poor into the station, some of whom had taken to prostitution as a means of livelihood.
Suggestions for sanitary improvements.	None.
Sanitary works ...	None.

Secunderabad.

Drainage ...	Fairly satisfactory, requires improvement.
Water-supply ...	Indifferent.
Barrack accommodation.	Ample.
Epidemics ...	Cholera more or less throughout the year and small-pox. There were 19 cases among the troops and 11 deaths. One European officer died.

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Conservancy and sanitary condition.	Conservancy of both public and private latrines is well attended to by a proper staff of scavengers and carts. The sanitary condition of the town and bazaars has been considerably improved both as regards drainage and conservancy.
Prices of food and meteorology.	The climate on the whole good, considering the scarcity that prevailed throughout the district and the large influx of indigent people. Food was occasionally scarce and prices high. 30·9 inches of rain fell, being 4·9 inches above the average.
Cantonment rules ...	In force. 230 women on the register. Much greater vigilance was exercised in the detection of unregistered women. The detective police should be increased and rewards given when great vigilance is shown, and the regimental authorities should insist on the men pointing out the source from which they contracted disease.
Suggestions for sanitary improvements.	Proposals were submitted for improving the condition of several patches of wet cultivation and several tanks which become a marsh and a nuisance during the hot weather.
Sanitary works ...	Three hundred seventy-five additional yards of main drains were constructed, and one first-class drain to the extent of 978 yards. All the existing drains were opened and cleaned out, and the wells and tanks deepened and improved.

Seetabuldee.

Drainage ...	On the whole satisfactory, but that in the Native Infantry Lines is bad, being situated on low ground.
Water-supply ...	Good and abundant in the rainy weather, but becomes scant and indifferent in the hot season.
Barrack accommodation.	Ample.
Epidemics ...	Small-pox prevailed and broke out among the families of the Native Regiment also.
Conservancy and sanitary condition.	Conservancy of latrines, &c., satisfactory, on the dry-earth system. Sanitary condition of bazaars good.
Prices of food and meteorology.	Climate generally healthy. Prices of food high owing to exportations to the famine districts. 56·8 inches of rain fell against 37·4 in 1876.
Cantonment rules ...	In force. 19 women on the register. Working of the rules during the year was satisfactory, but closer supervision on the part of civil authorities required.
Suggestions for sanitary improvements.	None.
Sanitary works ...	None.

Shoyagheen.

Drainage ...	Good.
Water-supply ...	Good, from wells.
Barrack accommodation.	No European troops.
Epidemics ...	None.
Conservancy and sanitary condition.	Conservancy of latrines good, on the dry-earth system. Sanitary condition of station generally good.
Prices of food and meteorology.	Climate healthy. Food at moderate prices and abundant. Rainfall 157 inches, being 12 inches more than in 1876.
Cantonment rules ...	Not in force.
Suggestions for sanitary improvements.	None.
Sanitary works ...	Nothing of importance. Wells were cleaned, and the grounds around were weeded.

Sumbulpore.

Drainage ...	Of the station generally indifferent, owing to its situation on the bank of a large river surrounded by hills and intersected by nullahs. The lines, however, are favorably situated on rising ground.
Water-supply ...	Fair in quality, from wells.
Barrack accommodation.	No European troops.

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Epidemics ...	A few cases of cholera occurred among civil population.
Conservancy and sanitary condition.	No public latrines. Conservancy of private latrines indifferent, and freer use of dry earth necessary. Sanitary conditon of station tolerably good. Sewage buried in parallel trenches on a selected spot which will be cultivated.
Prices of food and meteorology.	Climate generally healthy. Prices of food moderate. Rainfall slightly above the average, being 67·6 inches against an average of 66·1.
Cantonment rules ...	Not in force.
Suggestions for sanitary improvements.	None.
Sanitary works ...	Repairing of some of the drains.

Sironcha.

Drainage ...	Good.
Water-supply ...	Good, from wells.
Barrack accommodation.	No European troops.
Epidemics ...	Slight prevalence of cholera among civil population.
Conservancy and sanitary condition.	There are no public latrines; the only latrine in the hospital is kept clean on the dry-earth system of conservancy. Sanitary condition of station satisfactory. Sewage from private dwellings is removed every day to the jungles at a distance.
Prices of food and meteorology.	Prices of food very high. Rice 5¼ Madras measures per rupee. Rainfall below the average, being 39·6 against 42·9.
Cantonment rules ...	Not in force.
Suggestions for sanitary improvements.	None.
Sanitary works ...	A large tract of jungle was cleared.

Tonghoo.

Drainage ...	Good; surface drainage.
Water-supply ...	Good.
Barrack accommodation.	Ample.
Epidemics ...	Slight prevalence of cholera among Natives in October and November.
Conservancy and sanitary condition.	Conservancy of latrines fair on the dry-earth system. Sanitary condition of bazaars and station satisfactory. Sewage carried away 3 miles from cantonment and buried in the jungle.
Prices of food and meteorology.	Climate generally healthy. The hot season was a prolonged one. Food abundant and prices moderate. Rainfall 77 inches against 75 in 1876.
Cantonment rules ...	In force. 18 women on the register. Decrease in venereal diseases. Special Police Inspectors should be appointed to detect suspicious characters. Many camp-followers supposed to be married often carry on prostitution and give infection.
Suggestions for sanitary improvements.	None.
Sanitary works ...	Some marshy pieces of ground have been cleared out and converted into tanks. Pumps have been erected over some of the wells in the European barracks.

Thayetmyoo.

Drainage ...	Good, from the natural configuration of the ground.
Water-supply ...	Good, from wells.
Barrack accommodation.	Ample.
Epidemics ...	Cholera; 12 cases and 7 deaths occurred among the European troops; none among the Native regiments.
Conservancy and sanitary condition.	Conservancy of latrines generally good on the dry-earth system. Sanitary condition of station and bazaars indifferent. Sewage carted away daily to the jungle and buried.
Prices of food and meteorology.	Climate generally good. Was very oppressive during the hot season. Food abundant and at moderate prices. Rainfall 62 inches against an average of 46.

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Cantonment rules ...	In force since 1869. 24 women on the register. Decrease in venereal diseases.
Suggestions for sanitary condition.	Public latrines for the Native bazaar much needed.
Sanitary works ...	A new masonry drain was constructed.

Trichinopoly.

Drainage ...	Good.
Water-supply ...	Good, from irrigation channels and wells.
Barrack accommodation.	Sufficient.
Epidemics ...	Cholera in an epidemic form. The Native Regiments suffered from it; 32 cases with 11 deaths occurred among them. None among the European troops.
Conservancy and sanitary condition.	Conservancy of latrines good on the dry-earth system. Sanitary condition of station and bazaars satisfactory. Sewage carted away by the Municipality. Public latrines 5 to every 1,000 inhabitants.
Prices of food and meteorology.	Climate generally healthy. Prices of food high. Heavy rain fell at the latter end of the year, September to December; little or no rain in the earlier months; total registered 37·9, being 3 inches above average.
Cantonment rules ...	In force. 85 women on the register. Working of the rules satisfactory.
Suggestions for sanitary improvements.	None.
Sanitary works ...	The sanitary works consisted in the filling in of moats in the construction of 2 latrines, 1 dust-bin, and 2 cinerators, and in the repairing of drains, roads, latrines, &c., at a cost of 5,284 Rupees.

Trichoor.

Drainage ...	Satisfactory.
Water-supply ...	Good, from wells.
Barrack accommodation.	No European troops.
Epidemics ...	None.
Conservancy and sanitary condition.	Conservancy of latrines good on the dry-earth system. Sanitary condition of bazaars and station satisfactory. Sewage carted to a distance and buried.
Prices of food and meteorology.	Climate healthy. Prices of food moderate. Rainfall not known. No record kept.
Cantonment rules ...	Not in force.
Suggestions for sanitary improvements.	None.
Sanitary works ...	None.

Vellore.

Drainage ...	Fair.
Water-supply ...	Good, from wells.
Barrack accommodation.	Not applicable.
Epidemics ...	Cholera and small-pox prevailed in an epidemic form among civil population. The diseases occurred among the troops also, among whom there were 42 cases and 18 deaths of the former, and 14 cases with no death of the latter. Famine-diarrhœa and dysentery also prevalent.
Conservancy and sanitary condition.	Conservancy of latrines good on the dry-earth system. Sanitary condition of station and bazaar satisfactory. Sewage removed by the Municipality.
Prices of food and meteorology.	Climate unhealthy during the year. Some thousands of people were employed in the neighborhood of the lines on famine-relief works. Food scarce and very dear; abundant rainfall at the end of the year. Total quantity registered amounted to 48·2 inches against an average of 36·4.

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Cantonment rules ... Not in force.
Suggestions for sanitary improvements. None.
Sanitary works ... None.

Vizagapatam.

Drainage ... Good.
Water-supply ... Good, obtained from Dhobyspettah.
Barrack accommodation. No barracks for European Infantry Veteran Company; they dwell in private houses in the parcherry.
Epidemics ... Cholera prevalent in the town. It broke out among the families of the 7th Regiment Native Infantry also, with 8 cases and 2 deaths, 1 occurring in a sepoy.
Conservancy and sanitary condition. Conservancy of public latrines satisfactory. Dry-earth system is not adopted, but is intended to be used. Many of the latrines have been damaged during the late cyclone, and have not been repaired as yet. Sanitary condition of bazaars and station satisfactory, being attended to by the Municipality.
Prices of food and meteorology. Climate exceptional both as regards heat and rainfall. Prices of food high owing to large exportations to famine districts. Rainfall 40 inches against an average of 45.
Cantonment rules ... Not in force.
Suggestions for sanitary improvements. None.
Sanitary works ... V shaped drains are being laid down by the Municipality and reclaiming of a large swamp is under contemplation.

Vizianagaram.

Drainage ... Good, both natural and artificial.
Water-supply ... Good, from wells.
Barrack accommodation. No European troops.
Epidemics ... None.
Conservancy and sanitary condition. Conservancy of latrines good on the dry-earth system. Sanitary condition of station and bazaars satisfactory. Sewage carted away to a long distance and buried.
Prices of food and meteorology. Climate unfavorable to health. Long continuous hot season and failure of rain. Prices of food very high owing to large exportations. Rainfall below the average; 40 inches against an average of 45.
Cantonment rules ... Not in force.
Suggestions for sanitary improvements. None.
Sanitary works ... None.

Wellington.

Drainage ... Good.
Water-supply ... Water-supply of cantonment good, obtained from springs; that of the bazaars indifferent.
Barrack accommodation. Ample.
Epidemics ... Slight prevalence of cholera, small-pox, fever and dysentery: 2 cases of cholera occurred among the troops; 1 recovered.
Conservancy and sanitary condition. Conservancy of latrines good on the dry-earth system. Sanitary condition of bazaars, &c., good. Refuse carried away and sold to planters.
Prices of food and meteorology. Climate unhealthy. Prices of food very high. Abundant rain at the end of the year; 65·8 inches against an average of 46·7.
Cantonment rules ... In force. Fifty-four women on the register. The Act should be extended to Ootacamund.
Suggestions for sanitary improvements. A lock and detail hospital should be built in the bazaars, and the present water channel should be lined with stone.
Sanitary works ... A swamp is being converted into a lake. Sanitary condition of the cantonment was attended to, and all nuisances removed.

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SECTION VIII.

SANITARY WORKS—CIVIL.

Municipalities.

479. The year 1877 was an exceptional one, and the sad memories connected with it will be carried down to posterity for ages to come. Famine and pestilence raged a terrible war with the inhabitants of a great number of the districts of Southern India, taxing the energies of the administrative authorities to the utmost extent. The influence of the calamity that befel the districts was also felt in the several principal towns within the famine area, as is evidenced by the large excess of mortality that occurred in them over the average of former years. Observations on the vital statistics of the Municipalities in the Presidency and the influence exercised by the famine on birth and death-rates are, given elsewhere in this Report and in the Table (XI) in the appendix, which may be referred to for information on these points, suffice it here to remark that the year was characterised by abnormally high death and low birth-rates. Hence the comparison made in the two previous years as to the effects of sanitary expenditure upon health cannot be followed up in the year under review for obvious reasons.

480. The people in the rural circles and villages having exhausted all their resources of subsistence, and not finding employment in the fields, wandered away from their homes in search of labor and food. Thus large numbers of the starving poor flocked into the principal centres of population and sheltered themselves in the streets and thoroughfares, and on the pials and verandahs of houses, thereby rendering it difficult to carry out the ordinary sanitary arrangements of the towns, and impeding progress in sanitary works. If the Sanitary Report of 1877 records a small amount of progress made in sanitation in the several Municipalities, the cause is not far to seek, and it must be attributed to the famine, to the results of which the attention of the Commissioners and the resources of the Municipalities were mainly directed.

481. The following is a brief abstract of the sanitary progress made in each Municipal town during 1877 summarised from the reports received by the Sanitary Commissioner. Besides these sanitary reports, the Sanitary Commissioner also receives certain statements (Grant III) of the annual budget estimates from each Municipality relating to sanitation and vaccination; he reports to Government on the adequacy or otherwise of the grants for these purposes, and Government, in instances where no reasonable cause can be shown, direct the revision of the estimates in accordance with his remarks. From 20 to 30 per cent. of income is considered a fair provision for the ordinary sanitary purposes of a town, and a lump sum from Rupees 200 to 250 may be accepted as a fair share of the Municipal income to provide for a First-class Vaccinator, cost of supervision, contingencies, &c. In some of the towns the Civil Surgeons undertake the duty of supervising Vaccination.

Adoni.

Population, 22,723.
Births registered, 409 or 17·9 per mille.
Deaths, 1,308 or 57·5 per mille.
Number vaccinated, 1,312.
Estimated income, Rupees 26,925.
Estimated expenditure for sanitary purposes,
Rupees 5,924 or 22·0 per cent. of income.
Estimated expenditure for vaccination, Rupees 170.

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482. Repairs were made to several roads, drains and latrines, 2 large wells were deepened and cleaned out, and measures were adopted to ensure a supply of water during the hot season. The construction of masonry drains in certain portions of the town is in progress.

Sanitary works.

483. During the famine there was a large influx of the starving poor (nearly 30,000) into the town, rendering sanitation a difficult matter. A large staff of extra conservancy establishment was however maintained to keep the town as clean as possible. As was to be expected, the health of the town was very bad; cholera, small-pox, fevers, and bowel-complaints being mostly prevalent. Advantage was taken of the large crowds in the town to push on vaccination, and 1,312 persons were operated upon against 793 in the year previous.

General health.

Anantapore.

Population, 4,918.
Births registered, 152 or 30·9 per mille.
Deaths, 464 or 94·3 per mille.
Number vaccinated, 300.
Estimated income, Rupees 6,000.
Estimated expenditure for sanitary purposes, Rupees 1,900 or 31·6 per cent. of income.
Estimated expenditure for vaccination, Rupees 100.

484. Nothing of importance. A sum of nearly Rupees 300 was spent in the repair of certain roads and drains. The conservancy of the town was attended to by a distinct staff at a cost of Rupees 1,820. Even this had to be reduced owing to want of funds about the middle of the year.

Sanitary works.

485. Not satisfactory. 464 deaths were registered against 130 in the year previous. The prevailing diseases were cholera (46), fevers (79), and bowel-complaints (83). 300 persons were vaccinated against 207 in the preceding year. Famine-stricken poor flocked into, and died in the town.

General health.

Bellary.

Population, 51,766.
Births registered, 465 or 8·9 per mille.
Deaths, 2,471 or 47·7 per mille.
Number vaccinated, 2,013.
Estimated income, Rupees 59,630.
Estimated expenditure for sanitary purposes, Rupees 32,232.
Estimated expenditure for vaccination, Rupees 556.

486. None, from want of funds. The town population was subjected to severe distress during the year. Great difficulty was experienced in the early part of the year in regard to sanitary arrangements owing to the massing of large crowds of famine wanderers in the town. Extra conservancy establishments had to be maintained to keep the town clean. Later in the season famine wanderers were relegated to a camp outside the town.

Sanitary works.

487. Bad. 2,471 deaths were registered against 1,575 in 1876, small-pox (39), fevers (391), and bowel-complaints (626) being the chief diseases. 2,013 persons were vaccinated against 1,052 in 1876.

General health.

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Berhampore.

Population, 21,670.
Births registered, 485 or 22·3 per mille.
Deaths, 943 or 43·5 per mille.
Number vaccinated, 193.
Estimated income, Rupees 15,560.
Estimated expenditure for sanitary purposes, Rupees 4,202 or 27·0 per cent. of income.
Estimated expenditure for vaccination, Rupees 120.

488. One road, 400 yards in length, commenced in 1876, was completed; 180 yards of V shaped drains were constructed, and the roads, drains, and dust-bins were repaired. Conservancy was well attended to. In a sanitary point of view much requires to be done. The removal of one or two dirty parcherries to better sites, a complete system of drains, and the filling in of a dirty tank are required.

Sanitary works.

489. On the whole favorable, with the exception of an outbreak of cholera supposed to have been brought in by famine wanderers from the south. 943 deaths were registered against 480 in 1876. Cholera contributed 34 of these deaths.

General health.

Bimlipatam.

Population, 8,744.
Births registered, 172 or 19·6 per mille.
Deaths, 299 or 34·1 per mille.
Number vaccinated, 394.
Estimated income, Rupees 9,413.
Estimated expenditure for sanitary purposes, Rupees 2,001 or 21·2 per cent. of income.
Estimated expenditure for vaccination, Rupees 150.

Sanitary works.

490. Only 66 yards of drains were constructed.

491. On the whole satisfactory. Native population suffered from dearness of food. 299 deaths were registered against 253 in the previous year. Cholera contributed 77. No deaths from small-pox. Number vaccinated 394 against 312 in 1876.

General health.

Calicut.

Population, 47,962.
Births registered, 834 or 17·3 per mille.
Deaths, 1,471 or 30·6 per mille.
Number vaccinated, 1,342.
Estimated income, Rupees 34,545.
Estimated expenditure for sanitary purposes, Rupees 6,569 or 19·0 per cent. of income.
Estimated expenditure for vaccination, Rupees 264 or 19·0.

492. Nothing of importance. A new well was sunk to provide against scarcity of water, and a shed for small-pox patients was erected. Conservancy was attended to by a distinct establishment.

Sanitary works.

493. Not satisfactory. 1,471 deaths were registered. Cholera (427), small-pox (166), fevers (102), and bowel-complaints (138) were the chief diseases. Number vaccinated was 1,342 against 1,068 in 1876. Famine wanderers from Coimbatore pervaded the town.

General health.

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Cannanore.

Population, 31,358.
Births registered, 540 or 17·2 per mille.
Deaths, 703 or 22·4 per mille.
Number vaccinated, 1,388.
Estimated income, Rupees 21,436.
Estimated expenditure for sanitary purposes, Rupees 6,402 or 29·8 per cent. of income.
Estimated expenditure for vaccination, Rupees 267.

494. Two culverts were constructed; several roads, drains, latrines, tanks, and wells were repaired and cleaned out, and rank vegetation removed. Conservancy of latrines, &c., was well attended to on the dry-earth system.

Sanitary works.

495. With the exception of cholera, on the whole satisfactory. 703 deaths were registered, of which 347 were from cholera. Only 1 death from small-pox. There has been a falling off in vaccination; only 1,388 operations were performed against 1,895 in 1876.

General health.

Chedumbaram.

Population, 15,519.
Births registered, 219 or 14·1 per mille.
Deaths, 305 or 19·6 per mille.
Number vaccinated, 520.
Estimated income, Rupees 15,086.
Estimated expenditure for sanitary purposes, Rupees 5,720 or 37·9 per cent. of income.
Estimated expenditure for vaccination, Rupees 144.

496. None. Temporary leaf-latrines were put up on the dry-earth system during the festivals that took place in the town, and which passed off without any sickness occurring. The conservancy of the town was attended to by the conservancy establishment.

Sanitary works.

497. Not very satisfactory. The year was characterised by an outbreak of cholera (68 deaths) and great distress from famine. 18 deaths occurred from small-pox. The number vaccinated amounted to 520 against 356 in 1876.

General health.

Chicacole.

Population, 15,587.
Births registered, 258 or 16·5 per mille.
Deaths, 537 or 34·4 per mille.
Number vaccinated, 230.
Estimated income, Rupees 9,898.
Estimated expenditure for sanitary purposes, Rupees 2,590 or 26·1 per cent. of income.
Estimated expenditure for vaccination, Rupees 150.

498. One hundred and eighty-four yards of masonry drains were constructed, prickly-pear bushes were removed, and the roads, drains, latrines, &c., were repaired. The total sanitary expenditure amounted to Rupees 2,800.

Sanitary works.

499. Cholera and fevers appear to have been the prevailing diseases. Of the former there were 187, and of the latter 104 deaths. 230 persons were vaccinated against 189 in 1876.

General health.

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Cocanada.

Population, 17,839.
Births registered, 564 or 31·6 per mille.
Deaths, 697 or 39·0 per mille.
Number vaccinated, 927.
Estimated income, Rupees 25,130.
Estimated expenditure for sanitary purposes, Rupees 4,865 or 19·3 per cent. of income.
Estimated expenditure for vaccination, Rupees 190.

500. A road, 250 yards in length, was constructed, which is to be prolonged, and a large culvert was erected. The roads, tanks, wells, and latrines, &c., were repaired; the cess-pools were cleaned out daily, and the general conservancy was well attended to.

Sanitary works.

501. Cholera, fevers, and bowel-complaints were the prevailing diseases. Out of a total of 697 there were 173, 113, and 80 deaths respectively from these causes. 927 persons were vaccinated against 791 in 1876.

General health.

Cochin.

Population, 13,840.
Births registered, 405 or 29·2 per mille.
Deaths, 317 or 22·9 per mille.
Number vaccinated, 519.
Estimated income, Rupees 13,020.
Estimated expenditure for sanitary purposes, Rupees 2,400 or 18·4 per cent. of income.
Estimated expenditure for vaccination, Rupees 200.

502. Two masonry latrines and a drain were constructed, and all the existing drains, latrines, dust-boxes, &c., were repaired and kept clean and the general conservancy of the town properly attended to. A good supply of water available.

Sanitary works.

503. Satisfactory. Cholera and small-pox slightly prevailed, but not epidemically. 317 deaths were registered against 424 in 1876, and the number vaccinated amounted to 519 against 667, showing a decrease of 148 cases.

General health.

Coimbatore.

Population, 35,310.
Births registered, 965 or 27·3 per mille.
Deaths, 2,477 or 70·1 per mille.
Number vaccinated, 1,679.
Estimated income, Rupees 30,930.
Estimated expenditure for sanitary purposes, Rupees 7,620 or 24·6 per cent. of income.
Estimated expenditure for vaccination, Rupees 190.

504. Seven culverts, a masonry channel in the slaughter-house, and a wooden bridge were built at a total cost of Rupees 664. A new well was sunk and two others are under construction. All the latrines, drains, &c., were repaired and kept clean, and the general conservancy attended to.

Sanitary works.

505. The public health suffered severely from famine throughout the district. Large crowds of people flocked into the town and swelled the mortality rate considerably. 2,477 deaths were registered against 472 in 1876, and the chief causes of death were cholera (272), small-pox (175), fevers (410), and bowel-complaints (1,080). 1,679 vaccine operations were performed against 1,549 in 1876.

General health.

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Combaconum.

Population, 44,444.
Births registered, 1,389 or 31·2 per mille.
Deaths, 2,220 or 49·9 per mille.
Number vaccinated, 1,131.
Estimated income, Rupees 33,364.
Estimated expenditure for sanitary purposes, Rupees 10,014 or 30·0 per cent. of income.
Estimated expenditure for vaccination, Rupees 335.

Sanitary works.

506. Three tunnels, two latrines, and one well were constructed, and other minor new works. Several roads were widened, and others together with latrines, tunnels, dust-boxes, &c., were repaired and kept in good order, and the general conservancy of the town was attended to.

General health.

507. Fair on the whole, but the mortality rate was to some extent enhanced by the influx of the starving poor from the surrounding famine countries, among whom the deaths principally occurred. 2,220 deaths were registered during the year, and the chief causes were cholera (257), small-pox (243), fevers (336), and bowel-complaints (498). There was a falling off in vaccination: only 1,131 operations were performed against 1,510 in 1876.

Conjeeveram.

Population, 37,327.
Births registered, 697 or 18·6 mille.
Deaths, 3,386 or 90·7 per mille.
Number vaccinated, 1,233.
Estimated income, Rupees 18,460.
Estimated expenditure for sanitary purposes, Rupees 5,390 or 29·1 per cent. of income.
Estimated expenditure for vaccination, Rupees 320.

Sanitary works.

508. None, with the exception of minor repairs to some roads. Want of funds and the famine has been a great check to sanitary progress.

General health.

509. Not satisfactory. 3,386 deaths were registered. Cholera with 688 deaths and small-pox with 114 prevailed epidemically, and a large mortality (1,857) occurred from bowel-complaints incidental to famine. Opportunity was taken of the large assemblage of people in relief camps to push on vaccination. 1,233 operations were performed during the year against 767 in 1876.

Coonoor.

Population, 3,058.
Births registered, 86 or 28·1 per mille.
Deaths, 472 or 154·3 per mille.
Number vaccinated, 763.
Estimated income, Rupees 16,425.
Estimated expenditure for sanitary purposes, Rupees 4,552 or 27·7 per cent. of income.
Estimated expenditure for vaccination, Rupees 180.

Sanitary works.

510. Nothing, from want of funds. The conservancy establishment was considerably augmented to maintain cleanliness in the town and do battle with the unhealthiness around.

General health.

511. Not very satisfactory. 472 deaths were registered against 156 in 1876. Cholera, small-pox, fevers, and bowel-complaints were rather prevalent; but the famine was the main cause of the excessive mortality. Wanderers from the low country came up in great numbers and died. 763 persons were vaccinated against 447 in 1876.

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Cuddalore.

Population, 40,290.
Births registered, 1,153 or 28·6 per mille.
Deaths, 1,175 or 29·1 per mille.
Number vaccinated, 1,554.
Estimated income, Rupees 26,730.
Estimated expenditure for sanitary purposes, Rupees 7,070 or 26·4 per cent. of income.
Estimated expenditure for vaccination, Rupees 230.

Sanitary works.

512. Two latrines were constructed on an improved plan. A piece of ground was purchased for a Mahomedan burial-ground and a new cart-stand was established. Such of the drains, roads, and dust-bins as required repairs were attended to. Improvements to the drains are under contemplation. The conservancy of the town was well attended to. The sweepings are let out to contractors who sell them to the ryots to be used as manure.

General health.

513. Unsatisfactory. 1,175 deaths were registered; the chief causes were cholera (222), small-pox (97), fevers (146), and bowel-complaints (271) caused chiefly by the dearness and scarcity of food from which this town suffered. 1,554 persons were vaccinated during the year. Famine affected the South Arcot District in July, August, and September.

Cuddapah.

Population, 16,275.
Births registered, 349 or 21·4 per mille.
Deaths, 1,143 or 70·2 per mille.
Number vaccinated, 1,078.
Estimated income, Rupees 25,322.
Estimated expenditure for sanitary purposes, Rupees 5,252 or 20·7 per cent. of income.
Estimated expenditure for vaccination, Rupees 130.

Sanitary works.

514. Several roads, streets, and lanes were widened and repaired, two sheds in the market were completed, six temporary urinals were constructed, and two temporary latrines were replaced by permanent ones. The reconstruction of a drinking-water well which fell in was commenced and is in progress. The general conservancy of the town was carefully looked after.

General health.

515. Unsatisfactory. Famine prevailed throughout the district. Cholera, small-pox, and fevers were exceedingly prevalent, and bowel-complaints aggravated by want and bad food carried off large numbers; 271, 48, 384, and 171 deaths occurred from each of these causes, respectively, out of a total of 1,143 deaths. Advantage was taken of the assemblage of people in the relief houses to prosecute vaccination, and 1,078 operations were performed against only 297 in 1876. The relief camp was outside the town, and the mortality of it does not appear in the town returns.

Caroor.

Population, 9,378.
Births registered, 223 or 23·7 per mille.
Deaths, 329 or 35·0 per mille.
Number vaccinated, 315.
Estimated income, Rupees 8,400.
Estimated expenditure for sanitary purposes, Rupees 2,090 or 24·8 per cent. of income.
Estimated expenditure for vaccination, Rupees 90.

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516. A new latrine was built, the market was improved, and a new well was sunk at a total cost of Rupees 743. Several roads, drains, latrines, wells, &c., were repaired at a cost of Rupees 1,729. The usual conservancy of the town was attended to by an establishment costing Rupees 2,038.

Sanitary works.

517. Not. satisfactory, 329 deaths were registered out of a population of 9,378: cholera (79), fevers (84), and bowel-complaints (58) were the chief causes of mortality. Famine distress drove many strangers into the town.

General health.

Dindigul.

Population, 12,865.
Births registered, 370 or 28·7 per mille.
Deaths, 596 or 46·3 per mille.
Number vaccinated, 7,267.
Estimated income, Rupees 7,734.
Estimated expenditure for sanitary purposes, Rupees 2,086 or 26·9 per cent. of income.
Estimated expenditure for vaccination, Rupees 180.

518. Four latrines and two stone dust-bins were constructed, three new wells were sunk, the fort ditch was filled, and several tanks and wells were repaired, and other minor works carried out. The sanitary condition of the town was well attended to, but the large influx of famine paupers into the town was a great check to sanitary progress.

Sanitary works.

519. Unsatisfactory. Famine, insufficiency of food, and the eating of unwholesome articles of food affected the health of the population and caused considerable mortality. 596 deaths were registered against 261 in 1876, cholera (271) and bowel-complaints (128) being the chief causes. There were a few cases of small-pox also. Here also advantage was taken of the assemblage of the famine poor to push on vaccination. 7,267 operations were performed, of which 5,996 took place in the relief camps. The mortality of the relief camp is not included in the town returns but in those of the taluqs.

General health.

Ellore.

Population, 25,487.
Births registered, 798 or 31·3 per mille.
Deaths, 931 or 36·5 per mille.
Number vaccinated, 795.
Estimated income, Rupees 16,305.
Estimated expenditure for sanitary purposes, Rupees 2,880 or 17·6 per cent. of income.
Estimated expenditure for vaccination, Rupees 150.

520. Six side drains (3 of masonry) were built, a well was sunk, and fences put around others; all the existing drains, latrines, and wells were put in repair, and the sanitary condition of the town carefully attended to. Water-supply sufficient.

Sanitary works.

521. An outbreak of cholera caused 259 deaths out of a total of 931.

General health.

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Erode.

Population, 10,201.
Births registered, 204 or 19·9 per mille.
Deaths, 2,573 or 252·2 per mille.
Number vaccinated, 347.
Estimated income, Rupees 7,436.
Estimated expenditure for sanitary purposes, Rupees 1,670, or 22·4 per cent. of income.
Estimated expenditure for vaccination, Rupees 90.

Sanitary works.

522. Several wells were dug and cleaned out, the old fort wall was knocked down, two sheds for contagious diseases were built, a large piece of land near the jungle stream was reclaimed, a channel was dug to carry off surplus rain water, and other minor works were carried out, and the sanitary condition of the town was carefully looked after.

General health.

523. Bad. The famine prevailing throughout the Coimbatore district affected the town of Erode also, and sent immense numbers of strangers into the town and caused considerable mortality among the townspeople. 2,573 deaths were registered during the year against only 303 in the previous year. Cholera (420), small-pox (133) and bowel-complaints aggravated by bad and insufficient food (1,325) were the chief causes. 347 persons were vaccinated against 43 in 1876. The town population at one time was more than doubled by the accumulation of famine-stricken people and the presence of relief works in the neighborhood.

Ghooty.

Population, 6,730.
Births registered, 53 or 7·8 per mille.
Deaths, 454 or 67·4 per mille.
Estimated income, Rupees 4,140.
Estimated expenditure for sanitary purposes, Rupees 2,044, or 49·3 per cent. of income.

Sanitary works.

524. None. The famine was a great check to sanitary progress. Some of the roads, drains, latrines, wells, &c., were repaired and kept in good order, and the sanitary condition of the town attended to as well as the circumstances, under the privation and distress which the town suffered from, admitted of.

General health.

525. Unsatisfactory. 454 deaths were registered against 272 in 1876. Cholera (86) and bowel-complaints were the principal causes. No separate Vaccinator was empolyed in this town; the Local Fund Board Vaccinator operated in the town, but his returns are included in the taluq vaccination.

Guntoor.

Population, 18,033.
Births registered, 402 or 22·2 per mille.
Deaths, 469 or 25·9 per mille.
Number vaccinated, 1,930.
Estimated income, Rupees 32,360.
Estimated expenditure for sanitary purposes, Rupees 7,388 or 22·8 per cent. of income.
Estimated expenditure for vaccination, Rupees 280.

Sanitary works.

526. No new works. The roads and latrines in the town were repaired, and some improvements made to the Black tank. The conservancy of the town was attended to by a staff of scavengers.

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527. Satisfactory. No cholera, but 37 deaths occurred from small-pox. Total deaths registered was 469 against 358 in 1876. There were 1,930 vaccine operations performed during the year against 390 in 1876.

General health.

Kurnool.

Population, 25,579.
Births registered, 690 or 26·9 per mille.
Deaths, 4,329 or 169·2 per mille.
Number vaccinated, 397.
Estimated income, Rupees 17,250.
Estimated expenditure for sanitary purposes, Rupees 6,000 or 34·7 per cent. of income.
Estimated expenditure for vaccination, Rupees 190.

Sanitary works.

528. Nothing was done from want of funds and owing to the famine that prevailed. The general conservancy of the town was attended to, but owing to large crowds of famine-stricken strangers flocking into the town some difficulty was experienced in the sanitary arrangements.

General health.

529. Bad. 4,329 deaths were registered against 1,150 in 1876. Most of these deaths must be attributed to the famine. The population suffering from bad and insufficient food fell easy victims to disease: cholera (189), small-pox (252), fevers (1,400), and bowel-complaints (1,231) were the chief causes of mortality. Only 397 persons were vaccinated against 415 in 1876. Kurnool was a famine-relief centre during all the year; hence the great mortality registered.

Madura.

Population, 51,987.
Births registered, 2,346 or 45·1 per mille.
Deaths, 3,298 or 63·4 per mille.
Number vaccinated, 2,986.
Estimated income, Rupees 79,955.
Estimated expenditure for sanitary purposes, Rupees 18,120 or 22·6.
Estimated expenditure for vaccination, Rupees 440.

Sanitary works.

530. Nothing of importance; only a few repairs to the drains and other buildings. In this town also famine prevailed during the year.

General health.

531. Unsatisfactory. Cholera, small-pox, fevers, and bowel-complaints were the principal causes of mortality. There were registered from these diseases 787, 59, 189, and 585 deaths, respectively, out of a total of 3,298. The number vaccinated amounted to 2,986. Famine distress drove large numbers of starving people into the town. The mortality would have been higher only that the relief-camp was outside the municipal limits of registration.

Manargudi.

Population, 17,703.
Births registered, 579 or 32·7 per mille.
Deaths, 627 or 35·4 per mille.
Number vaccinated, 477.
Estimated income, Rupees 14,270.
Estimated expenditure for sanitary purposes, Rupees 1,650 or 11·5 per cent. of income.
Estimated expenditure for vaccination, Rupees 145.

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532. No new works. The meat and fish market commenced last year was completed; the conservancy of the town was carefully attended to; several roads, streets, drains, and latrines were kept clean by a large conservancy establishment; particular attention was paid to the water-supply, which was ample.

Sanitary works.

533. The people suffered greatly from want of the seasonal rains. Large numbers of starving poor from other places, especially Madura, crowded the town, making the place unhealthy; and with famine in several districts of the Presidency the prices of the staple articles of food rose very high.

General health.

Mangalore,

Population, 29,712.
Births registered, 601 or 20·2 per mille
Deaths, 1,472 or 49·5 per mille.
Number vaccinated, 8,240.
Estimated income, Rupees 27,070.
Estimated expenditure for sanitary purposes,
Rupees 4,790 or 17·6.
Estimated expenditure for vaccination, Rupees 150.

534. Nothing of importance. A new latrine was built, and great attention was paid to the sanitary condition of the town by a sufficient conservancy establishment.

Sanitary works.

535. Fair. Small-pox prevailed to a great extent and carried off 718 persons, nearly half the mortality from all causes. Vaccination was vigorously prosecuted and 8,240 subjects were operated upon against 3,149 in 1876.

General health.

Masulipatam.

Population, 36,188.
Births registered, 494 or 13·6 per mille.
Deaths, 740 or 20·4 per mille.
Number vaccinated, 654.
Estimated income, Rupees 26,510.
Estimated expenditure for sanitary purposes,
Rupees 5,255 or 19·8 per cent. of income.
Estimated expenditure for vaccination, Rupees 250.

536. No new works. Beyond repairs effected to some roads, drains, latrines and water-supply conduits, nothing has been done. The conservancy of the town is very badly attended to by a small and inefficient establishment with whom it is impossible to keep the town clean. The latrines are filthy, and pigs are allowed to do the scavengering work. These animals are permitted to roam all over the town. The same was noticed in last year's report, but no steps appear to have been taken to remedy the evil. Altogether the sanitary arrangements of Masulipatam are defective and unsatisfactory.

Sanitary works.

537. Cholera prevailed and carried off 203 persons. Distress from dearness of food prevailed to some extent.

General health.

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Mayaveram.

Population, 21,165.
Births registered, 380 or 17·9 per mille.
Deaths, 366 or 17·2 per mille.
Number vaccinated, 401.
Estimated income, Rupees 16,180.
Estimated expenditure for sanitary purposes, Rupees 4,284 or 26·4.
Estimated expenditure for vaccination, Rupees 160.

538. A road, 16 dust-bins, a latrine, and 2 cinerators were constructed during the year. 12 temporary latrines were erected during a festival that took place in the year, and a permanent substantial fence was put around a large tank. Several roads, streets, and 7 old bridges, the cart-stand, and toll-gates were repaired. During the hot season pits were dug in the bed of the Cauvery river to provide the town with water for drinking and bathing purposes, and watchmen kept to prevent them from being polluted. The usual conservancy of the town was well looked after, and during the festival special sanitary arrangements were made.

Sanitary works.

539. Slight prevalence of cholera occurred, causing 26 deaths. There was a falling off in vaccination. Only 401 operations were performed against 759 in 1876.

General health.

Mettapollium.

Population, 4,144.
Births registered, 52 or 12·5 per mille.
Deaths, 683 or 164·8 per mille.
Estimated income, Rupees 6,745.
Estimated expenditure for sanitary purposes, Rupees 2,130 or 31·5.

540. This is a new Municipality, the Act being put in force only a year ago; consequently the sanitary progress made is but trifling. Two drains with culverts were constructed, and the existing drains and roads were cleaned and repaired. The conservancy of the town was attended to by an establishment of sweepers and carts.

Sanitary works.

541. Not satisfactory. Cholera and "bowel-complaints" prevailed. Of the former there were 92 deaths and of the latter 461 out of a total mortality of 688. There was a great through traffic of wanderers to the Hills, many of whom fell sick and died on the road; and famine relief camps were put up in the vicinity of the town which attracted strangers. No Vaccinator has been employed in this town; the Hospital Assistant in charge of the dispensary operated on 26 subjects.

General health.

This Municipality has since been abolished.

Negapatam.

Population, 48,525.
Births registered, 1,014 or 20·8 per mille.
Deaths, 2,057 or 42·3 per mille.
Number vaccinated, 906.
Estimated income, Rupees 40,330.
Estimated expenditure for sanitary purposes, Rupees 12,301 or 30·5.
Estimated expenditure for vaccination, Rupees 300.

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Sanitary works. 542. None. A few minor repairs were made, and the sanitary condition of the town was attended to by the conservancy establishment.

General health. 543. Unsatisfactory. 2,057 deaths were registered against 1,386 in 1876. Cholera (444), small-pox (362), fevers (219), and bowel-complaints (316) were the chief causes of death. 906 persons were vaccinated against 790 in 1876.

The grain traffic at the *port* drew many wanderers from famine districts.

Nellore.

Population, 29,922.
Births registered, 477 or 15·9 per mille.
Deaths, 2,992 or 99·9 per mille.
Number vaccinated, 3,264.
Estimated income, Rupees 28,310.
Estimated expenditure for sanitary purposes, Rupees 7,390 or 26·1 per cent. of income.
Estimated expenditure for vaccination, Rupees 169.

Sanitary works. 544. Besides constructing a few dust-boxes and effecting some repairs, nothing appears to have been done during the year as regards sanitary works. The conservancy of the town was, as usual, attended to. This is another of the towns that suffered severely from the famine prevailing in Southern India, and this may account for the want of sanitary progress.

General health. 545. Unsatisfactory. The dearness of food and large congregations of the starving poor in the town unfavorably affected the public health. The people, weakened by want and by bad and unwholesome food, fell easy victims to the epidemic diseases that prevailed; and cholera, small-pox, fevers, and bowel-complaints carried them off by hundreds. From these causes alone the deaths amounted to 1,676 out of a total of 2,992. Vaccination was vigorously prosecuted. Among the famine-stricken 3,264 subjects were operated on against 1,083 in 1876.

Ootacamund.

Population, 9,982.
Births registered, 367 or 36·7 per mille.
Deaths, 747 or 74·8 per mille.
Number vaccinated, 1,286.
Estimated income, Rupees 51,000.
Estimated expenditure for sanitary purposes, Rupees 9,500 or 18·6 per cent. of income.
Estimated expenditure for vaccination, Rupees 250.

Sanitary works. 546. Nothing of importance. The "wattle" (*Acacia dealbata*) on the western slope of the jail, which was a nuisance, and a good deal of undergrowth from the compounds of the European residents, was removed. The sanitary condition of the town was attended to. Many improvements are required, the most important being a proper system of drainage for the native town and the covering of the open water-supply channels to protect them from contamination. A report by a committee appointed last year, containing suggestions for the improvements of the town, is now before Government.

General health. 547. Unsatisfactory. 747 deaths were registered against 315 in 1876. Cholera (97), small-pox (125), and fevers (165) prevailed largely. 1,286 persons were vaccinated, being 582 in excess of last year. Famine migrants from the low country found their way up to the hills in large

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numbers, and many perished on the way. Cholera, for the first time in our history of the station, prevailed epidemically in March and April, choosing the most insanitary quarters of the bazaar for its habitation.

Palamcottah.

Population, 17,945.
Births registered, 665 or 37·0 per mille.
Deaths, 744 or 41·4 per mille.
Number vaccinated, 450.
Estimated income, Rupees 16,225.
Estimated expenditure for sanitary purposes, Rupees 2,280 or 14·0 per cent. of income.
Estimated expenditure for vaccination, Rupees 190.

Sanitary works.

548. Nothing of importance. A drain was excavated in the Regimental Lines, a dust-box and a dry-earth shed were constructed, and some repairs to existing buildings made. The conservancy of the town was, as usual, attended to.

General health.

549. Fair. Cholera and small-pox prevailed somewhat and caused 86 and 56 deaths respectively out of a total of 744. 450 persons were vaccinated during the year against 248 in 1876.

Palghaut.

Population, 30,752.
Births registered, 1,220 or 39·6 per mille.
Deaths, 1,378 or 44·8 per mille.
Number vaccinated, 699.
Estimated income, Rupees 17,190.
Estimated expenditure for sanitary purposes, Rupees 1,818 or 10·5 per cent. of income.
Estimated expenditure for vaccination, Rupees 125.

Sanitary works.

550. Nothing new was done during the year.

General health.

551 Unsatisfactory. Famine in the surrounding districts and the influx of famine wanderers into the town raised the prices of food, and affected the public health considerably. 1,378 deaths were registered against 1,108 in 1876. Cholera (which caused 371 deaths), small-pox (43), fevers (283), and bowel-complaints (129), were the principal causes of mortality.

Rajahmundry.

Population, 19,738.
Births registered, 605 or 30·6 per mille.
Deaths, 1,043 or 52·8 per mille.
Number vaccinated, 768.
Estimated income, Rupees 17,470.
Estimated expenditure for sanitary purposes, Rupees 7,050 or 40·3 per cent. of income.
Estimated expenditure for vaccination, Rupees 150.

Sanitary works.

552. None. The conservancy of the town was, as usual, attended to by a staff of inspectors, sweepers, and carts.

General health.

553. An outbreak of cholera caused 278 deaths; 758 persons were vaccinated against 401 in 1876.

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Salem.

Population, 50,012.
Births registered, 1,182 or 23·6 per mille.
Deaths, 2,326 or 46·5 per mille.
Number vaccinated, 1,997.
Estimated income, Rupees 40,370.
Estimated expenditure for sanitary purposes, Rupees 14,400 or 35·6 per cent. of income.
Estimated expenditure for vaccination, Rupees 480.

554. *Sanitary works.* Nothing of importance. A few minor works were executed, such as mud-wall latrines and night-soil pits. Owing to the scarcity of water, four large reservoirs were constructed from famine funds, besides a few draw-wells on the river bank.

555. *General health.* Unsatisfactory. The year was an exceptionally unfavorable one owing to the failure of the monsoons. This town suffered severely from famine, and the mortality was very high, chiefly from famine diseases. Cholera, small-pox, fevers and bowel-complaints numbered their victims by hundreds. These causes alone contributed 1,475 deaths out of a total mortality of 2,326. 1,997 persons were vaccinated against 1,161 in 1876. The registered mortality would have been higher only for the presence of relief-camps outside the Municipal limits.

Srirungum.

Population, 18,655.
Births registered, 280 or 15·0 per mille.
Deaths, 1,057 or 56·6 per mille.
Number vaccinated, 518.
Estimated income, Rupees 14,881.
Estimated expenditure for sanitary purposes, Rupees 3,864 or 25·9 per cent. of income.
Estimated expenditure for vaccination, Rupees 300.

556. *Sanitary works.* Nothing of importance. An additional ward to the hospital was completed. Several roads, streets, and drains were repaired, and side channels cut to provide good surface drainage. The water-supply is excellent, obtained from the rivers Cauvery and Coleroon. The sanitary condition of the town was, as usual, attended to by the conservancy establishment. Special sanitary arrangements were made during the annual festival, which passed off without any sickness.

557. *General health.* Fair. Cholera and small-pox prevailed somewhat and caused respectively 109 and 151 deaths. Bowel-complaints contributed 280 deaths to a total of 1,057. Famine wanderers added much to the usual mortality.

Tuticorin.

Population, 10,565.
Births registered, 392 or 37·1 per mille.
Deaths, 1,392 or 131·7 per mille.
Number vaccinated, 908.
Estimated income, Rupees 12,750.
Estimated expenditure for sanitary purposes, Rupees 3,115 or 24·4 per cent. of income.
Estimated expenditure for vaccination, Rupees 210.

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558. None. Conservancy was fairly attended to with the small establishment for the purpose. The establishment must be increased if proper results are to be obtained. Private latrines are cleaned only on every other day, a practice much to be deprecated. There is an entire absence of designed drainage in the town, and the defect was strikingly illustrated during the heavy rains in December, when the roads became water-logged, causing much damage to them and the houses on the sides.

Sanitary works.

559. Unsatisfactory. 1,392 deaths were registered against 868 in 1876. Cholera and bowel-complaints, incidental to famine, were the chief causes of mortality. Small-pox also prevailed to some extent.

General health.

Tinnevelly.

Population, 21,044.
Births registered, 679 or 32·2 per mille.
Deaths, 1,002 or 47·6 per mille.
Number vaccinated, 585.
Estimated income, Rupees 15,925.
Estimated expenditure for sanitary purposes, Rupees 4,530 or 28·4 per cent. of income.
Estimated expenditure for vaccination, Rupees 250.

560. Two cross tunnels, a culvert and a masonry side-wall to a channel were constructed. The beds of the irrigating channels were cleaned out, three of the main streets were gravelled, the market was repaired, the streets, lanes, roads, drains, and latrines were repaired and kept clean, and the sanitary condition of the town was, as usual, looked after by a staff of sweepers.

Sanitary works.

561. Fair. Cholera and bowel-complaints prevailed to some extent, 180 and 205 persons respectively having died from these causes. 585 persons were vaccinated, being 184 more than in 1876. Famine was not severely felt in this part of the district, though the wandering poor flocked into the towns in the worst time and contributed to the increased mortality.

General health.

Trichinopoly.

Population, 76,530.
Births registered, 1,559 or 20·3 per mille.
Deaths, 2,961 or 38·6 per mille.
Number vaccinated, 2,416.
Estimated income, Rupees 57,670.
Estimated expenditure for sanitary purposes, Rupees 17,704 or 30·6 per cent. of income.
Estimated expenditure for vaccination, Rupees 936.

562. Filling in the moat, erection of sheds, &c., at the market, a verandah to the slaughter-house and a shed at the dead-house; and in the construction of a tank, two latrines, one dust-bin and two cinerators. Several roads, drains, latrines, &c., were repaired and the conservancy of the town was attended to by an establishment maintained for the purpose.

Sanitary works.

563. Unsatisfactory. 2,961 deaths were registered against 2,002 in 1876. Cholera (441), small-pox (481), and bowel-complaints (1,114), principally among the famine-stricken, were the chief causes of mortality. 2,416 persons were vaccinated against 1,991 in 1876.

General health.

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Tanjore.

Population, 52,175.
Births registered, 1,453 or 27·8 per mille.
Deaths, 2,337 or 44·7 per mille.
Number vaccinated, 1,151.
Estimated income, Rupees 46,810.
Estimated expenditure for sanitary purposes,
Rupees 12,000 or 25·6 per cent. of income.
Estimated expenditure for vaccination, Rupees 320.

Sanitary works.

564. A sum of Rupees 11,662 is reported as having been spent on new works, but most of this sum, viz., Rupees 11,106, was spent in taking levels and preparing plans, &c. for the water-supply project under contemplation. The only works executed consisted in the construction of a latrine, five cinerators and poudrette sheds, and a few minor works at a cost of Rupees 446. Rupees 332 were spent in repairs, which consisted in deepening a well, repairing a tank, side drains and cinerators, and covering the rubbish depôt with earth. The sanitary condition of the town was attended to by the conservancy establishment.

General health.

565. Indifferent. 2,337 deaths were registered against 1,651 in 1876. Cholera (497), small-pox (352), fevers (225), and bowel-complaints (598) were the principal diseases, and contributed mostly to make up this large mortality. Famine wanderers added largely to mortality. Two vaccinators are employed in this town, and they vaccinated 1,151 subjects against 956 in 1876. The amount of vaccination work was not so great as it should be.

Tellicherry.

Population, 20,504.
Births registered, 441 or 21·5 per mille.
Deaths, 622 or 30·3 per mille.
Number vaccinated, 649.
Estimated income, Rupees 14,733.
Estimated expenditure for sanitary purposes,
Rupees 2,880 or 19·5 per cent. of income.
Estimated expenditure for vaccination, Rupees 240.

Sanitary works.

566. No new works were executed. A few roads, wells, latrines, &c. were repaired. The conservancy of the town was fairly attended to.

General health.

567. On the whole fair. Cholera prevailed throughout the year, but at no time in a severe epidemic form, and caused 193 deaths. Only two deaths occurred from small-pox; total deaths registered amounted to 622 against 776 in 1876. Famine in the other districts caused prices of food to run high. There was a great falling off in vaccination; only 649 operations were performed against 2,981 in 1876. No explanation is given for this deficient work; but the number vaccinated exceeded the total births registered, and the unusual vaccination in the former year was probably due to the presence of an epidemic of small-pox.

Vellore.

Population, 38,022.
Births registered, 851 or 22·3 per mille.
Deaths, 2,808 or 73·8 per mille.
Number vaccinated, 7,366.
Estimated income, Rupees 32,327.
Estimated expenditure for sanitary purposes,
Rupees 9,462 or 29·2 per cent. of income.
Estimated expenditure for vaccination, Rupees 440.

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568. None. The conservancy of the town was, as usual, attended to.

Sanitary works.

569. Unfavorable. This is one of the towns in which famine prevailed and the people suffered very much from high prices of food. Cholera, small-pox, fevers, and bowel-complaints caused the greatest mortality. 1,787 deaths were recorded from these diseases out of a total of 2,808. 7,366 persons were vaccinated during the year against 2,256 in 1876. Advantage was taken of the assemblage of people in the town owing to the famine, to prosecute vaccination.

General health.

Vizagapatam.

Population, 32,191.
Births registered, 936 or 29·0 per mille.
Deaths, 1,438 or 44·6 per mille.
Number vaccinated, 202.
Estimated income, Rupees 21,140.
Estimated expenditure for sanitary purposes, Rupees 7,743 or 36·6 per cent. of income.
Estimated expenditure for vaccination, Rupees 174.

570. Two latrines, on the Coimbatore plan, commenced in 1876 were completed; a channel 788 yards long was cut to more successfully carry off the drainage of the town to the river; 35 yards of surface drains were laid; Dykes' tank was cleaned out; 50 dust-bins were constructed; a large quantity of prickly-pear bush and wild plants was removed; 14 lamp-posts were put up; and the old Mahomedan burial-ground situated near a well containing drinking water was closed, and an unobjectionable spot on the swamp was raised and set apart for the purpose. The drainage was looked after, and the conservancy of the town received due attention by the establishment maintained for the purpose.

Sanitary works.

571. With the exception of an outbreak of cholera, fair on the whole. 1,438 deaths were registered against 989 in 1876; to these cholera contributed 338; bowel-complaints carried off 88 persons, and fevers 203. There was a partial failure of the north-east monsoon, and exportation to the famine countries raised the prices of food, which told upon the poor and made them more liable to be attacked by disease. Vaccination was very indifferently carried out.

General health.

Vizianagram.

Population, 20,169.
Births registered, 591 or 29·3 per mille.
Deaths, 829 or 41·1 per mille.
Number vaccinated, 633.
Estimated income, Rupees 13,105.
Estimated expenditure for sanitary purposes, Rupees 3,709 or 28·3 per cent. of income.
Estimated expenditure for vaccination, Rupees 180.

572. Two hundred and thirteen yards of tunnels, 166 yards of drains, and 25 yards of bridges were constructed. Some tunnels, culverts, and all the latrines were repaired, improved, and kept in good order, and sundry pits of stagnant water were filled up.

Sanitary works.

573. Indifferent. Cholera was prevalent and caused 319 deaths. Fevers, too, prevailed somewhat, with 301 deaths. Failure of rain and exportation of grain to the famine districts raised the prices of food and caused some distress among the people. 633 persons were vaccinated during the year, showing a decrease of 151 operations below those of 1876.

General health.

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Wallajahpet.

Population, 12,103.
Births registered, 353 or 29·1 per mille.
Deaths, 980 or 80·9 per mille.
Number vaccinated, 472.
Estimated income, Rupees 10,500.
Estimated expenditure for sanitary purposes, Rupees 2,840 or 27·0 per cent. of income.
Estimated expenditure for vaccination, Rupees 164.

574. Some prickly-pear to the extent of 5,100 yards was cleared. The roads, streets, drains, and latrines were repaired and kept in good order. Several tanks and wells were deepened and cleaned, and two new wells dug as famine relief-works, which averted a water scarcity.

Sanitary works.

575. Unsatisfactory. The people suffered much from want and high prices of food. 980 deaths were registered, cholera and bowel-complaints being the diseases that caused the largest mortality, viz., 145 and 249 respectively. 472 persons were vaccinated against 122 in 1876.

General health.

SECTION IX.

GENERAL REMARKS.

576. Surgeon-Major Henry King, M.B., continued to officiate as Sanitary Commissioner during January 1877.

I returned from furlough to Europe on the 28th January, and assumed charge of my office on the 29th January.

577. The "Personal Proceedings" of the Sanitary Commissioner throughout the year have been almost entirely connected with famine administration. The critical condition of the population, the increasing pressure of the food-scarcity, and the ravages of epidemic pestilences amongst the starving poor, rendered it absolutely essential that the attention of the Health Department should be concentrated on devising measures for the immediate relief of the people, rather than on ordinary inspections of Municipal towns and rural populations with the view of suggesting sanitary works of a permanent character. The time for such suggestions was singularly inopportune, as every Municipality and Local Fund Board had become impecunious through causes connected with the famine, and whatever recommendations of a sanitary character might have been made, there was no possibility of their immediate adoption.

Duties in connection with famine.

On receiving charge of my office it was intimated to me that the Government desired to have a sanitary inspection of the specially distressed districts, and His Grace the Governor, in a personal interview, was pleased to direct that I should commence operations by an enquiry into the condition of the population of the town of Madras, and of the starving poor flocking by thousands into the town for relief.

578. A very brief period sufficed to inform me that the sanitary condition of the town population, and especially of the thousands of starving wanderers attracted to the town by the hope of getting food and work, was truly deplorable. Cholera was rife, and the victims more numerous than at any time during my twenty years' experience of the health of the city. Small-pox was rapidly increasing,

Critical condition of public health in town of Madras.

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and famine-diarrhœa was already destroying many lives in our relief-camps and hospitals. The town mortality in fact from an average of 40 to 50, had suddenly sprung up to nearly 200 *per diem* in the first week of February. With the influx of houseless and homeless wanderers into the town, the ordinary scavengering establishment of the Municipality was unable to cope with the difficulties of keeping the town in a cleanly state. The Municipality had no advising health officer of its own, and had but recently, as a measure of economy, amalgamated its conservancy department with that of the Engineer, who, in addition to his own duties, was responsible for those of the sanitary department. The water-supply of the town was not only scanty, but as derived from the town water works, of most indifferent quality; and to meet all the extra demands of famine and pestilence, the Municipality had only to show an empty cash-chest, and finances inadequate even to ordinary current expenditure.

Suggestion for a Health Establishment and house-to-house visitation.

579. It was evident that special measures were needed for dealing with the abnormal state of things in Madras. My report, No. 105 of the 7th February 1877, shows the actual sanitary state of the town, and the measures proposed to remedy the more urgent defects. It is reprinted here with the Government " order " on it:—

I have the honor to report, for the information of Government, the present state of public health in the town of Madras.

2. By the mortality returns of the Municipality, I observe that, in the month of January, the total deaths amounted to 3,911, whereas our average mortality for the same period for the previous ten years amounted to 1,171.

3. Of course many of these deaths are due to the influx of distressed persons from other districts, but the figures furnished to me do not show the deaths of strangers separately. (From 11th December to 3rd February I see that 699 deaths occurred in the camps of Monegar Choultry, Salt Cotars, and Royapettah.) The number of strangers in the town during January can only be estimated, but even if we allow that the Municipal population has been increased from nearly 400,000 in 1871 to 450,000 in 1877, this present death-rate is most unusual, being in fact in the ratio of 104·3 per mille per annum. For the few days of February for which I have returns, our population appears to be dying at the rate of nearly 200 per diem. The significance of this statement may be more apparent if I remark that mortality in the same ratio would cause the disappearance of the existing population in the space of from six to seven years. These figures include the deaths in the famine camps within Municipal limits.

4. So far as my observation goes the excessive mortality at the present time is mainly confined to the poorer classes of the population, and especially to the outcaste races of the town and neighborhood. Some of the poorer Mahomedans also are feeling very severely the present dearth of food, and are suffering from privation and its sad consequences. (The death registers show cholera to be very prevalent in and around Triplicane.)

By the last census there were more than 50,000 Mahomedans in Madras, while the lower classes of the Hindus, amongst whom distress is most evident, number about one-fourth of the population. There is, in fact, an excessive mortality in progress amongst the poorer classes of the people, who number from one-third to one-half of the entire population.

5. I have visited the relief houses and camps within Madras, and also those outside, at Yerkancherry and Red Hills, and have thus had a fair opportunity of observing the nature of the diseases prevailing, and noting the main causes of mortality.

Cholera Deaths.	
November	97
December	376
January	1,602

6. The diseases of an epidemic nature are—1, cholera; 2, small-pox. Of the former there were reported 1,600 deaths in January, a higher monthly number than has ever occurred within my recollection. (The only figure coming at all near it was 1,200 deaths in July 1860.) The mortality from cholera seems to have been increasing rapidly since November, as shown in the margin.

Small-pox Deaths.	
November	10
December	72
January	205

7. Small-pox is very prevalent, and, although the deaths from it are not numerous in our camps and hospitals, the mortality from it in January was 205. The disease increases rapidly during the hot, dry months, and a greater ratio of mortality may be expected. The rapid increase of mortality since November from this cause is shown in the margin.

Diarrhœa Deaths.	
November	59
December	312
January	465

8. Besides these two epidemic causes, there is shown a considerable mortality from " DIARRHŒA. " The figures for the last three months are given marginally. These three diseases account for the deaths of 2,272 of the people in January, but, after deducting these specified causes of death from the total of 3,911 deaths reported in the month, there remain 1,653 deaths (a higher mortality than is customary in any average month), the causes of which are not distinctly specified.

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9. I may state here, as the result of my personal inquiries, that, although cholera in its epidemic form is still prevalent in the town, the mortality shown above under this heading is probably exaggerated.

Famine-diarrhœa is liable to be mistaken for epidemic cholera. Mistakes of this kind are not made in hospitals or relief-camp returns, but they are made by the reporters of Municipal registration.

10. While, however, epidemic cholera may not be so bad as the statistics would indicate, the fact of nearly 4,000 persons dying within our town limits in January would seem to indicate that we have a very terrible state of things to look in the face. If the mortality from epidemic disease has been exaggerated, that resulting from slow starvation has hardly yet been assigned the place its importance demands.

11. I have seen now enough of the relief operations in the immediate neighborhood to convince me that the people who are being fed at the Government expense are in utter destitution, and but for the timely help thus afforded them would die in much greater numbers than they are now dying. In the plainest terms, I must here record the fact that the *physique* of the people who come to the relief-camps indicates simply a prolonged existence on insufficient food, and that, in my opinion, this low state of body, from poor living, is the main factor in our present high mortality. It is amongst these impoverished people that mortality is most prevalent, and a very large number of those applying for relief are so reduced in frame that the expert can at a glance say of but too large a number of the applicants, "These *must* die!"

12. I apprehend that the relief-camps in operation are taking cognizance only of a portion of the people who are suffering from insufficient food. At a private relief-house near the Monegar Choultry this morning, I saw many children that were emaciated in the last degree, and I see them about in the streets in various parts of the town. There is evidently much misery amongst classes of the population who are not yet resorting to Government relief.

13. The saddest part of this matter is that a large number of the people (especially the old and young children) are virtually lost before they come in for relief. Their powers of assimilating food are gone, and when this result has followed upon slow starvation, no amount of subsequent feeding will save life.

It is a common belief that good and sufficient food will soon restore the animal functions that have suffered in the process of starvation; but however true this may be of rapid starvation (as in ships' crews wrecked at sea), it does not hold good in that gradual deterioration of health which results from using poor and insufficient nutriment. In these cases the organs which assimilate food may be vitally injured, or rendered powerless to exercise their functions, before the individual is aware that his health has been impaired. I have seen but too many instances within the last few days of men, women, and children (and especially of the latter) who must assuredly die, because of their inability to assimilate nutriment from the food provided for them.

14. I am afraid (from a general perusal of papers connected with famine and relief operations) that there is a want of precise knowledge in some quarters as to the connection between food and health. Without going into a detailed physiological account of this matter, I may remark that, if the human body is furnished with a due amount of suitable food, health and strength result; that when the supply of food becomes inadequate to meet the wants of the body, the body itself begins to waste and be consumed.

The first indication of an inadequate food-supply is the gradual disappearance of fat from the body. The skin gets thin and shrivelled, and the muscles become soft and flabby. From this, and even more advanced stages of starvation, the human body can recover by a timely supply of food; but when the body, in lieu of other nutriment, begins to feed on its own muscles, when the coats of the stomach and intestines begin to waste away also, then there is great danger that the essential functions of the alimentary canal to absorb nutriment from food for the nurture of the frame may become hopelessly impaired. It is this latter stage of privation that we have now to encounter in the crowds of weak and helpless flocking into our camps, and in the poorer classes of the population generally. In the camps a large number of the people have "diarrhœa," which simply means that the food given them is passing away without affording nutrition to the body. The same thing is doubtless prevalent amongst the poor in the town.

15. From these considerations it is clear that the past months of scarcity and bad feeding are only now beginning to show the inevitable results in the lowering of the standard of health and in excessive mortality. Practically it does not make much difference under what head the mortality may be registered. This is, in reality, a period of famine, and of close pinching of the poor. The adult men and women, as the food-winners, are probably also the principal food consumers in this period of general scarcity and high prices, for they have as yet suffered less than the old and the young children. It is amongst the old and worn out, and the children who are unable to work, that the famine promises to be so destructive. It is amongst these classes that the chief mortality occurs in the camps, and it is amongst the same classes of the resident poor that we may look for a rapid increase in the death-rate, unless

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measures can be organized to ensure a more general distribution of food, and to obtain some control over the pestilences now destroying this impoverished class of the people.

16. From this statement of the condition of the poorer population of the town, it follows that the indications for relief are—

First.—To feed the poor in such a manner as to prevent them from falling into that condition of debility and exhaustion which is so dangerous to life.

Second.—To endeavor to control the progress of epidemic diseases amongst this ill-fed population in a systematic way.

17. With regard to the first of these objects the famine-camps and relief houses already provided have undoubtedly been the means of saving much life. They have, however, been principally filled by the people who flocked into Madras from other districts on the first approach of famine, the residents of the town having, for the most part, been given a single meal of cooked food at these relief depôts to eat in their own homes. The applicants for this out-door relief, especially in Triplicane, Monegar Choultry, and Tondiarpet, are numerous.

18. Some private feeding-places (aided by Government) have recently closed, and, with regard to one I saw near the Monegar Choultry, I think the relief was given in such a form as to do but little good. The quantity of grain appeared to be insufficient, but being made up with butter-milk and a strong sprinkling of hot condiments, the people seemed very eager to share in the distribution. At this place I am told six bags of cooked rice are distributed daily amongst about 1,200 persons. A bag of rice weighs 154 lb. $=154 \times 6=924$, so that if this quantity is actually issued, the average dole per person would be about three-quarters of a pound of dry rice. But the heap of cooked rice awaiting distribution did not contain anything like six bags, according to my judgment, and Dr. Thompson (whose experience in these matters is great) was of opinion that the issue did not average half a pound of raw rice.

19. From the experience of this private relief house, I should judge that there must be a considerable number of poor in the town requiring help. I saw here many caste people as well as Pariahs. If the time has not already arrived, it must be very near when the necessity for increasing the relief houses for the distribution of cooked food must be urgent. It must be remembered that in the state of weakness induced by low living, the people (especially young children) cannot be taken to any great distance. (There are many children in the camps so enfeebled that a walk of one-quarter or half a mile would be impossible for them.) My suggestion, therefore, with regard to our town poor, is that relief-houses be opened in those parts where they do not now exist; that they be established in localities convenient to the poor of the several districts; and that the relief in them be mainly confined to the resident poor of the locality. I will consult with Colonel Drever as to the special localities to be chosen, and address Government again on this part of the question.

20. In regard to charitable distribution of food, I fear that the distress is too general to admit of much relief, except on a systematic plan of procedure. There is no reason why private individuals who are disposed to help should not send their rice-bags, &c., to the established depôts, or those to be established, so as to ensure the issue of suitable quantities of food. Probably also committees of residents may be able to supervise and help in food distribution.

21. In spite of all that may be done in the districts, I think it is quite clear that we shall continue to have a stream of wandering and homeless people flocking into Madras—people who come to get food or work. For these the relief-camps already established will afford accommodation and succour.

22. In regard to the second object—the control of epidemic diseases—a few words are necessary. The public health in Madras throughout 1876 was not good. Cholera (which was almost entirely in abeyance during 1871, 1872, 1873, and 1874) broke out in 1875, and has never since left us. That it is still prevailing, in epidemic form, the crowded wards of our hospitals sufficiently testify, even if we do not accept the Municipal returns as absolutely correct. Some portions of our population are happily as yet comparatively unaffected by this epidemic, but no one can tell how long this will continue. A shower or two of rain, at this season, may light up anew the elements of the disease, and cause sudden explosions of cholera amongst our troops, our European population, and other classes of the people who are not at present affected.

The general sanitary condition of the town is worse than I have ever known it (and my acquaintance with Madras dates back from the year 1858). The prolonged drought has kept the Cooum bar closed, so that the sewage flowing into that foul stream has had no outlet.

The old drains of Black Town are becoming more and more rotten and offensive, while the surface conservancy within the town and suburbs strikes me as having deteriorated. The water-supply from the Red Hills is scanty in quantity and deteriorated in quality, from the prolonged drought, and will probably soon cease altogether, leaving the population to depend mainly on wells and tanks that have fallen into disuse.

23. The Municipal authorities have no doubt had to encounter great and unusual difficulties in providing for the conservancy of the town during the influx of crowds of people of savage

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and filthy habits. Their finances are crippled to such a degree as to be unequal to the strain now bearing on them, and I look around, in vain, for any evidence of a systematic attempt to cope with the pestilences now raging in our midst.

24. Without further preface, I may state at once that, in the present urgent and critical condition of the town population, an *active Health Officer*, aided by an intelligent staff of assistants, is essential to the work in hand. To deal with this epidemic of cholera (as it would be dealt with in any civilized community) we should endeavor to arrange for a regular house-to-house visitation and inspection. We want to disinfect and purify where necessary, to give timely medical aid, to discover the starving poor and feed them, and to arrange so that the whole population shall be under this amount of sanitary supervision.

25. The Municipal authorities, with their restricted means, are not in a position to do what is necessary to be done; even if they had the means they have not the agents to employ on work of this kind.

26. The demands for medical aid are everywhere most urgent, and the Surgeon-General, Indian Medical Department, informs me that he has had to apply to Bengal for additional aid in the present emergency. There is hope in one direction only, and that is in the temporary employment of some of the senior pupils now studying in the Medical College, to work in the town of Madras, under the direction of a Special Health Officer (a visiting staff for house visitation was organized in this way some years ago for a cholera epidemic, and I believe with good results).

27. I need not say that I should be the last person to recommend any interference, on trivial grounds, with the usual course of medical study of our pupils receiving Government pay; but the present is an exceptional state of things.

28. Our medical staff all over the country is already working beyond its strength, and I keep firmly before me the fact that the people in this large town are perishing daily for want of the timely aid that a good visiting staff could supply.

29. Under these circumstances, I hope we may be permitted to make use of the senior students as a temporary expedient, and until public health shall be in a better condition. If this suggestion is approved, I think a fair staff of Health Inspectors can be at once organized so as to afford material aid under the direction of a Health Officer in coping with the disease and distress now so prevalent. Measures have been already sanctioned by Government for the establishment of a small-pox hospital and for the prosecution of vaccination in the crowded camps.

30. If Government should be pleased to approve of these general suggestions, for the extension of food-relieving centres for the town poor, and for the thorough health inspection of the people, the details in regard to these suggestions can be arranged in consultation with the Commissioner of Police and Surgeon-General, Indian Medical Department. I shall be glad to learn the orders of Government on the subject.

Order thereon, 13th February 1877, No. 174.

In the letter above recorded, the Sanitary Commissioner has brought to the notice of Government the very high death-rate prevailing in the town of Madras, caused by the presence of small-pox and cholera in an epidemic form, these diseases being aggravated by the privation under which the poorest class of the population are suffering, owing to the high prices consequent on the disastrous failure of the monsoon.

2. Dr. Cornish also describes the defects of conservancy in the town which is a concurrent cause of the high death-rate.

3. The Sanitary Commissioner recommends as remedial measures—

First.—An increase to the number of relief-houses, where cooked food can be given to the resident poor of the town.

Secondly.—A systematic house-to-house visitation of those portions of the town where epidemic disease is most severe, to be conducted under the direction of a Special Health Officer with a staff of medical assistants. The objects to be kept in view by the Health Officer will be to follow in the steps of epidemic sickness; to rescue those cases of want which give easy access to disease; to administer medical aid to those already smitten; to remedy immediately the more glaring defects of drainage and conservancy; and to convey to special temporary hospitals for small-pox and cholera the sufferers who require prolonged treatment.

4. It is proposed, pending the arrival of medical aid which has been sought from the Government of India, and which may shortly be expected, to utilise the services of the pupils of the Medical College, whose ready services in times of pressure have in past years been most willingly given, and have proved of the greatest utility.

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5. The President of the Municipal Commission has placed at the disposal of Government all the available resources of the Municipality, and the Surgeon-General, Indian Medical Department, and the Commissioner of Police have undertaken to secure the success of the Sanitary Commissioner's proposals by their hearty co-operation.

6. His Grace the Governor in Council cordially approves of Dr. Cornish's suggestions, and resolves to appoint Dr. Stanbrough as the Health Officer, to whom will be entrusted the work of directing the house-to-house visitation. Dr. Stanbrough will temporarily be relieved from his duties as Coroner of Madras, and these duties will be performed by the Deputy Coroner, Mr. T. G. Clarke.

7. Dr. Stanbrough will be furnished with a copy of the annexed instructions as to the manner in which the house-to-house visitation is to be conducted.

8. These instructions have been carefully prepared by the officers marginally noted, and contain all the most essential directions necessary to secure the important objects in view.

The President of the Municipal Commission.
The Surgeon-General, Indian Medical Department.
The Sanitary Commissioner.
The Commissioner of Police.

9. The Commissioner of Police, Colonel Drever, will, with the least possible delay, take the steps required for opening additional places of relief in those portions of the town where in his opinion these are necessary. No instructions on this matter are required by Colonel Drever, who has already so successfully carried out, in the relief-camps in and near Madras, this form of assistance to the poor. The only distinctive feature of these relief-houses is that they are intended principally for the *resident poor* of the city, the large numbers of wandering poor who come into Madras from the outlying provinces being already sufficiently provided for in the relief-camps. It will therefore only be necessary to provide at these new relief-houses cooked food, and not shelter as in the case of the relief-camps.

10. As soon as the arrangements for the full working of the house-to-house visitation and food distribution are completed, the Government desire to receive a statement showing the monthly cost involved in these arrangements, which will be debited to the famine-relief account.

11. The President of the Municipal Commission and the Commissioner of Police will make known, as widely as possible, the intention of the house-to-house visitation, and they will endeavor to secure, in the several wards of the town, the co-operation of all classes of the community in the efforts that are being made by the Government for the protection of the public health.

Instructions for Health Establishment.

580. In the interval between the submission of my report and the date of the Government Order (6 days), the Honorable Mr. Ellis, C.B., late Member of Council, assembled a conference of the following officials to devise means for carrying out my suggestion of an immediate house-to-house visitation of the town :—

Surgeon-General, I.M.D.
President, Municipal Commission.
Commissioner of Police.
Sanitary Commissioner.

After full discussion of ways and means, the following memorandum was drawn up, and met with the approval of the Committee and Government, and constituted the "instructions" to the Special Health Officer and his establishment :—

MEMORANDUM.

In accordance with G.O., 13th February 1877, No. 174, the following outline of a scheme is drawn up by a Committee composed of the Surgeon-General, Indian Medical Department, the Commissioner of Police, the President of the Municipal Commission, and Sanitary Commissioner.

Health Officer.—The direction of the work of house inspection will be under the superintendence of H. Stanbrough, Esq., now appointed Health Officer by Government.

The Health Officer will immediately proceed to the organization of an establishment for house-to-house visitation.

The special objects of house inspection will be to detect—

(1) Cases of epidemic disease.
(2) Cases of privation from want of the necessaries of life.
(3) Sanitary defects in houses and their prompt remedy, as far as these objects can be met, by fumigation, disinfection, and removal of house-filth, &c.

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He will conduct his duties generally in accordance with the provisions of the Municipal Act, and work in communication with, and aided by, the sanitary establishment of the Municipality.

The Health Officer will take cognizance of all questions bearing on the health of the people, and bring promptly to the notice of the President, Municipal Commission, all sanitary defects that he cannot remedy with the establishment at his disposal, assisted by the regular conservancy force of the Municipality. He will also assist the Municipal President in determining what steps shall be immediately taken to remedy the defects in question. He will submit a weekly report to Government (through the President of the Municipality)—

(1) Showing progress in organization.
(2) Houses inspected.
(3) Houses cleansed or purified.
(4) State of public health as indicated by the number of sick detected and relieved.
(5) Condition of the poorer classes as to food and numbers found in famishing condition.
(6) Such other points as require notice and special aid.

Health Inspectors.—To assist the Health Officer in his arduous duties, there being no qualified medical men available, and considering the urgency of the case, Government has been pleased to approve of the employment of students of the Medical College, and other locally-trained medical students, if available, to be employed in connection with the sanitary establishment of the Municipality in house-to-house visitation. The Surgeon-General, Indian Medical Department, will arrange for the services of not less than 16 students being made available for this special service. They will receive not less than one rupee per diem while so employed, in addition to their College stipends, and will be allowed a jutka for moving about in their duties.

(It is recommended that employment on this special service shall not prejudice the students in regard to their position in the College, and prospects of passing examinations for qualification hereafter.)

House Inspection.—The house-to-house visitation will be conducted according to the existing "*divisions*" and "*wards*" of the Municipality. There are 20 wards within the town limits. For the present, it is considered advisable to take up the inspection in the more thickly populated parts of the town, and the head-quarters of the several inspecting officers are to be as follows :—

Table showing the proposed distribution of Health Inspecting Establishments for the Town of Madras.

No.	Head-quarters.	Wards.	Divisions.
1	Vagrant's Home (Government Workhouse, Royapooram)	East	1st
2	Monegar Choultry Tannah	Centre	1st
3	Mint Gate do.	West	1st
4	Big Parcherry do.	North	2nd
5	Trevelyan Water Works (Municipal Store Depôt).	Centre	2nd
6	General Hospital Gate Tannah	South	2nd
7	Marine Dispensary, Beach	North	3rd
8	Mafooskhan's Garden Tannah	Centre and South ..	3rd
9	None	......	4th
10	Vepery Market	North	5th
11	Rundall's Road Depôt (a place to be secured) ...	Centre	5th
12	Harris' Bridge Tannah	South	5th
13	None	......	6th
14	Chintadrepettah (Vaccination Depôt)	North	7th
15	Triplicane (Vencatasawmi Naick's Market) ...	Centre	7th
16	Club Tannah and Royapettah	South and North ...	7th & 8th
17	Teynampett Tannah (excluding Royapettah, but taking in a part of the 6th Municipal Division.)	North and South ...	6th & 8th
18	Mylapore (No. 1 Station Police)	South	8th

The method of procedure in house-to-house visitation will be as follows : The President of the Municipality will give (under Section 139 of the Act) a written authority to each Health Inspector to enter into and inspect all buildings within his district.

NOTE.—The map boundaries of the several districts, the number of houses and population in each, will be furnished to the Health Inspectors by the Municipal President.

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Health Inspector's Staff.—The staff and accessories to be specially employed for this purpose will be:—

(1) A medical pupil, to be called "*Health Inspector*" while engaged on this duty.
(2) A "Duffadar" of the *Sanitary Department* of the Municipality.
(3) Coolies according to requirements.
(4) A conservancy cart.
(5) Disinfectants and dry earth in a cart.
(6) Stretchers for the removal of small-pox or starving people to hospital or camp.
(7) Prepared medicines for immediate use.
(8) Medical comforts (arrack).
(9) Jutkas for Health Inspectors and Sanitary Officials.
(10) Furniture (chairs and tables) for the tannah head-quarters, and arrangements for the accommodation of the Health Inspectors by day and night.
(11) Three Police Peons for each ward will be furnished for this special service.

The Health Inspector's establishment will proceed to make a regular inspection of all the inhabited areas within their respective districts.

On coming to a house or collection of huts they will ascertain—

(1) If there is any sickness in the house, noting especially cholera, diarrhœa, or small-pox.
(2) If any poor inhabitants are suffering from want of food.
(3) If the house is clean and free of nuisances.

In cases of ascertained sickness, the Health Inspector must use such remedies as appear immediately necessary. If the people are suffering from cholera, diarrhœa, or small-pox, he should persuade them to be taken to the nearest hospital, and provide means for their transport.

In cases of marked debility and emaciation from scanty food, he should give a ticket admitting the person to relief at the nearest local distribution of cooked food, and when the patient is unable to walk have him conveyed thither. Food tickets will be furnished by the Commissioner of Police.

All insanitary conditions should, as far as possible, be dealt with on the spot by the conservancy establishment. Special care should be taken to ascertain and report cases of overcrowding, in order that the Sanitary Inspector of the Municipality may give the certificate required by Section 140. They should clean, disinfect, and remove accumulations of filth and, by subsequent inspections, see that the work has been executed. All cases of unusual doubt or difficulty to be at once referred to the Health Officer for his instructions.

The inspections are most necessary, in the first instance, in crowded parcherries and hutting grounds, and these should be immediately looked to; but it is to be understood that the house inspection is to be thorough and complete for the inhabited area of all the wards in which the work is taken up. The Health Inspector will keep a diary, or register, showing the daily number of huts and houses visited, the street or locality inspected, with the results as to—

(1) Sickness,
(2) Distress,
(3) Sanitary defects, and
(4) Works carried out by the conservancy establishment in cleaning and disinfecting.

A summary of the results will be submitted daily to the Health Officer in tabular form.

It is expected that the Health Inspectors and officers of the Municipality and Police told off for this duty will all work together cordially, and for the public good.

Vaccination.—Notice of the prevalence of small-pox in any house or locality is at once to be made to the Superintendent of Vaccination, whose department will be temporarily strengthened to meet the demands for vaccination arising out of this inspection. Where necessary, a vaccinator will be temporarily attached to the Health Inspector in each ward.

The Commissioner of Police will endeavor to assist the working of the health department by causing immediate report of deaths from cholera or small-pox in the several wards to be made to the Health Inspectors.

Colonel Drever will undertake to supply each party with stretchers, to be kept at the tannahs or local depôts for the removal of sick to hospital and of the starving to relief houses.

Time of House Inspection.—The inspection of houses should be mainly pursued in the morning from ½ past 6 to 11 or 12 A.M. The Municipal authorities will furnish maps and boundaries of the Municipal wards.

Health Offices or Depôts.—The Health Inspectors should take up their residence at the several local depôts and be prepared to give out medicines for emergent relief at any time of the day.

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Each tannah or depôt should have a notice affixed to it in Tamil and English, stating that the establishment is maintained to help the people in suppressing disease, and in cleaning their houses, distributing medicines, &c.

The Health Officer will be expected to use his tact and discretion in organising and working the several parties of subordinates placed under him to carry out the intentions of Government. All heads of departments concerned, the Municipal President, the Surgeon-General, the Sanitary Commissioner, and Commissioner of Police will promptly help in the arrangements necessary to ensure a thorough health inspection.

Reports.—The forms of reports of daily work of the Health Inspectors should be printed. The diary of each Health Inspector will note the condition of each house inspected; but a summary of the day's work can be put into the daily report to the Health Officer, who, in going his rounds, will call for and inspect the diaries.

General duties of Health Officer.—In addition to the house inspection, the attention of the Health Officer should be directed to the state of the—

(1) Water-supply in various districts.
(2) The nature and quality of food exposed for sale in bazaars and markets.
(3) The accumulations of refuse and night-soil in crowded places.
(4) The condition of burial and burning grounds.

The latter, in the present time of undue mortality in the town, will probably want some special watching to ascertain the total number of deaths occurring day by day.

The Health Officer will endeavor to begin his work on Monday, the 19th. The organization can be immediately proceeded with, all arrangements having been settled and determined upon by the departments concerned.

[Signed (on behalf of the Committee)]

W. R. CORNISH,
February 15*th*, 1877. *Sanitary Commissioner, Madras.*

Organization of health department.

581. The whole business of organizing the special health establishment for the town was completed in a few days, and the newly-appointed Health Inspectors and their establishments, were at their posts and began work on the 19th February under the direction of H. Stanbrough, Esq., Coroner of Madras, the temporarily appointed Health Officer.

582. The establishment labored under the disadvantage of having to work with inexperienced youths whose professional education had only been in part completed; but, as a rule, the young men worked zealously and well, and were instrumental in bringing to light and remedying many insanitary conditions, and relieving present distress, and in combating especially the increasing ravages of small-pox.

583. The health establishment brought to light the fact that the town was not only swamped by houseless poor, but that every hut and dwelling-place was dangerously overcrowded by the country relatives of the town residents, who, in the famine time, had come to reside in the town. They had great difficulties in dealing with small-pox patients, who, in most cases, could not be persuaded to go to hospital. Hardly a house in the Native town escaped this pest.

584. The operations of this special health establishment were reported weekly direct to Government until the end of September when the condition of the population as to epidemics had been so much improved, and the arrangements for famine relief had been so completely organized, that its further continuance was not needed. It was essential too that the Government pupils of the Medical College engaged as Health Inspectors should rejoin their classes to qualify them as soon as possible for the public service.

Permanent Health Officer necessary for Madras.

585. The experience of 1877, however, exhibits the practical inconvenience of a large city like Madras attempting in ordinary times to dispense with the services of a qualified officer of health, and I trust, whenever the finances of the city will permit of the measure, that a Health Officer may be added to the permanent establishment of the Municipality.

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Organization of Relief Camps in Madras.

586. Before my return to India in January, Dr. King, Officiating Sanitary Commissioner, had been engaged in consultation with the Surgeon-General in arranging for sites and the character of temporary camps to be used for the reception of the famine-stricken poor in or near Madras. Three camps were put up in convenient sites for the denser portions of the town, and two were located outside—one about five miles out, and the other on the open laterite plains of the Red Hills, about ten miles distant from Madras. These camps were substantially built, but the huts were too large. Smaller and simpler huts, in our subsequent experience, were found to be more convenient, and to suit the habits of the people better.

Early impressions of the character of the food distress.

587. The following notes of inspections of some of these camps made in February are entered here, merely because they record first impressions of the ravages of famine amongst the people flocking into Madras, and thus have a value of their own independent of experience gained by greater familiarity with the subject :—

MEMORANDUM.

This morning Colonel Drever has obligingly taken me over the relief camps at Yeddakancherry and the Red Hills.

2. The former camp is situated about half way from Madras to the Red Hills and is intended as a halting stage for those weakly and emaciated strangers who are being sent out to the Red Hills. It is close by the main road and with a supply of water close at hand. The ground is rather low, but in this unusual drought there is no moisture in the soil.

There were about 1,100 persons in the camp this morning, mostly from Chingleput, Nellore, and North Arcot districts. They were almost all of the very lowest classes of the population ; many of them abject pictures of misery, their clothing in rags, and their skins shrivelled and dirty. The women and children are more numerous than the men, and of the latter a very considerable number show unmistakable symptoms of defective nutrition. I did not see a single person in camp (man, woman, or child) that I could pronounce to be in robust health.

3. The camp is very well laid out, most of the huts being small, accommodating about 15 in each. The ground around is kept clean considering the habits of the people, who prefer to foul it close by their huts rather than go to the latrines provided for them.

4. The food distributed is cooked rice with a curry of dhall and vegetable. The food was well cooked and wholesome. Many complain of the insufficiency of the ration (1 lb. of raw grain per adult in addition to the dhall and condiments). It is served at two meals. The conjee-water thrown out on the ground near the kitchen was fermenting and offensive, and I suggested to Colonel Drever that the soil should be dug over and arrangements made for having the rice-water carried away in future before it became fermented.

5. The hospital huts are under the charge of a Dresser temporarily employed by Colonel Drever, and who appears to be well up to his work. There were from 20 to 30 patients suffering from diarrhœa of a very severe type, and I fear that, in the majority of these cases, it will be impossible to save life. The poor creatures will not come in for medical treatment so long as they can crawl about. All these people were worn down to skin and bone and possessed but the feeblest vitality or rallying power. There were six patients with small-pox in a separate ward, and it is supposed that others are in camp who have it. Some vaccination has already been done, but I think it advisable to recommend a vaccinator to be attached to each camp as a temporary measure, to keep under, as far as possible, this particular form of disease which is usually most virulent in the months from January to April. I have addressed Government separately on this. Many of the poor creatures here are insufficiently clothed. Some of them have been provided with old rice bags (of gunny) to cover their nakedness and cause a little warmth at night.

6. My impressions of this camp, on the whole, are that it is working well and effecting the the object with which it was established. It is not intended to increase it.

Red Hills.

7. The Red Hill establishment is on a larger scale, and this morning there were nearly 3,000 persons receiving relief. They are precisely the same class of population—the outcaste races and descendants of the old servile castes. On the whole I do not think that the Red Hill Camp had so large a proportion of emaciated and badly nourished people as the half-way camp, but on this point it is difficult to speak with accuracy without a careful comparison of numbers.

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8. The hutting arrangements are still unfinished, but there is shelter for the present numbers collected. The site of the camp is quite unobjectionable in regard to the water-supply reservoir of the Town of Madras. It is so placed that no drainage from it can affect the water in the tank, and Police guards are placed to keep the people from the bund. It is found (in practice) that the people do not attempt to stray on to the tank bund. The conservancy establishment of this camp will, I think, need strengthening. The people are very dirty in their habits and defile the surface of the ground, especially in the old pits which are now being levelled and filled up by those able to work. I have suggested some tarred tubs being placed near each hut for night use, as the women and children will not go any distance and the surface will soon become saturated with foul animal matter.

9. The camp is well supplied with water of good quality from wells recently dug and from a tank in Teed's Garden. Some of the people are employed in excavating a tank (to be filled from an irrigation channel close by) so as to provide water for washing and bathing.

10. Owing to the hardness of the laterite soil there is great difficulty in excavating graves for the burial of the dead, but I find that the dead of the Monegar Choultry Camp, nearly all Pariahs, are *burned*, and this is certainly the best way of disposing of the dead, and one that I think will have to be followed at the Red Hills Camp should the mortality continue high. In the last week there were 52 deaths in the camp. If burning is carried out it must be at some distance, or, if possible, out of sight of the camp.

11. The principal cause of mortality here as in the Yeddakancherry Camp is famine-diarrhœa. There are some deaths from cholera and small-pox, but these are insignificant in comparison with the mortality due to long privation and want of the necessaries of life.

12. The camp hospitals are well attended to by the medical staff—a Surgeon and two Hospital Assistants; but it is advisable to have a sufficient staff to enable frequent visits to be paid to the huts to find out those suffering from disease and to bring them under treatment without delay. A Pensioned Apothecary might well be employed on this duty, the medical staff having enough on their hands to attend to the sick and dying who are brought into hospital.

MADRAS,
1st February 1877.

(Signed) W. R. CORNISH, F.R.C.S,
Sanitary Commissioner for Madras.

MEMORANDUM.

Inspected the Monegar and Salt Cotaur Relief Camps this morning. I met Mr. Thornhill, C.S.I., Senior Member of the Board of Revenue, at the Monegar Infirmary (who has had recent experience of relief camps in the Ceded Districts), and he was good enough to accompany me round the camps.

2. *Monegar Camp.*—The people generally in the Monegar Camp are improving in physique and appearance, but there are still a great many old persons and young children who are so far gone from privation that they cannot, I fear, be kept alive. The high mortality rate of these camps is kept up, in fact, by the removal of those who have partially regained their strength to outside camps, and to the constant and daily influx of people in the last stages of exhaustion from want.

The strength of the Tondiarpet and Monegar In-door Relief Camps for the week ending 10th February was	4,302
Deaths	71
Or 858·2 per mille per annum.	

There is no cholera at present in the camp, nor has there been for some time past. Small-pox is being kept down by vaccination and by removal of those attacked to the hospital sheds. The main cause of death (and the gravest feature in the business) is the number of cases of *famine-diarrhœa* in its several stages. The old and young are the chief victims, and many of these are in a most pitiable condition.

3. The latter stages of this famine-diarrhœa are the same, or nearly the same, in the old and young. In both the bodies are worn away to skin and bone. All the tissues that can readily be consumed have disappeared. The sick lie on the ground, in extreme weakness, curled up like a ball, the thighs drawn up against the abdomen, the head bending forward on the chest, and the arms folded close against the body. The surface of the body appears to be below the normal temperature, and the pulse is weak and barely to be felt. In some cases (but not in all) there is dropsical effusion about the feet and legs; even in little children of from 1 to 2 years of age this symptom frequently appears, and experience shows that it is generally a fatal symptom. The motions are mostly of a dysenteric character, and, if they do not contain *blood*, the bright green tint of the matters passed betoken *blood* in an *altered* condition. In these cases I apprehend that the fatal termination is really due to ulceration of the large intestine, but owing to press of work in the Medical Department nothing has yet been done to examine the exact pathology of this grave malady. The symptoms, however, are just those of the jail

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diarrhœa, of which I had experience at Coimbatore twenty years ago, and which occurred in miserable creatures who had been in a state of chronic starvation before coming into jail.

4. In these cases I always found great *thinning* of the coats of the intestines, with *extensive ulceration of the lower bowel*, these being the common and characteristic features of deaths from slow starvation in any clime or country. To show how far this pinching of the poor has gone, I may state that Dr. Thompson has seen cases of newly-born children where the process of starvation appears to have begun *in utero*. I have myself seen in the camps children only a few days old mere skin and bone, and though the mothers appear to have milk, it seems to have no effect in the nourishment of the children. In many of these instances the mothers themselves are not far advanced in emaciation, and yet their children are born so deficient in vitality as to have all the appearance of starved bodies.

5. To deal specially with the cases of children below one year of age, I have advised Dr. Thompson to have the mothers put into a special shed, to be used as a nursery only.

For these little ones some special provision in the way of milk-feeding is absolutely necessary if we are to save life. Milk is already given out for young children; but the difficulty is in seeing that the children get what is ordered for them, and that they get it in small quantities at short intervals. I imagine that more cows or buffaloes will be necessary to carry out this feeding of the children.

6. I have to suggest, for Colonel Drever's consideration, that for this nursery establishment three or four decent Native nurses should be got to go round with proper food at short intervals and to see that the infants are not neglected by their mothers. If a nurse or nurse-pupil from the Lying-in Hospital could be got to superintend this part of the work, it would be a measure calculated to save life.

7. I have been much struck with the fact that in most of our town depôts for relief the worst cases are those of villagers from the North Arcot, Nellore, and Chingleput Districts. The exact proportions of the population in the several camps for outside districts are doubtless known to Colonel Drever, but as it has been stated that distress is not imminent in North Arcot, I should wish to place on record that some of the worst famine cases I have seen in Madras have, by their own showing, come in from either our own taluqs or the Zemindari tracts in that district. Of course it is but natural that the poor will drift towards the Presidency town; but if the condition of the people coming in here be any index to the condition of the lower classes in the villages of the surrounding districts, I fear many of them must be in a bad way.

8. *Salt Cotaurs.*—There is no cholera in this camp, but the mortality is large from famine-diarrhœa. Seven deaths occurred yesterday.

Some drafts from this camp have recently been transferred to the Red Hills, but there are a good many able-bodied men here *who are fit to do work*, if work could be found them.

9. Some women came up to complain that they were Madras grass-cutters and had left their children at home in Teynampet when they were seized and brought in by the Police. They did not look like people in distress, and I informed the Superintendent that although the Police have orders to bring in all night stragglers, Colonel Drever expected him to use his discretion in releasing persons who were not fit objects of relief or charity. I made a verbal report to Colonel Drever before of the detention at this depôt of some musicians who were not the class of people we wanted to look after, and I think a little more exercise of *common sense* on the part of the Superintendent would be advisable.

10. With regard to *work*, the canal close by the camp is in a very filthy state, and ought now to be cleaned out from the General Hospital to Cochrane's Basin; but I suppose the Public Works Department have this in hand, and must be consulted. Probably Colonel Drever will think over this and communicate with the District Engineer. There should be a nursery for young children in this camp also.

Mr. Thornhill informs me that in all his visits to camps in the Mofussil he has seen no such terrible results of starvation as I have shown him this morning. While this is very satisfactory, so far as the Ceded Districts are concerned, it is not so satisfactory in regard to our neighboring districts, which send a continual stream of famished people into Madras, and points apparently to the need of closer watching by the authorities of those districts to meet the prevalent distress.

MADRAS, (Signed) W. R. CORNISH, Surgeon-Major, F.R.C.S.,
19*th February* 1877. *Sanitary Commissioner for Madras.*

Order thereon, 21st February 1877, No. 768-B.

The paragraph of Dr. Cornish's report relating to the influx of impoverished villagers from North Arcot, Nellore, and Chingleput will be communicated to the Collectors of those districts for information, and the paragraph relating to the detention of Teynampet grass-

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cutters and their removal to the camps by the Police will be communicated to the Commissioner of Police for the issue of such orders as may be necessary to ensure the exercise of more discretion on the part of the Police in forwarding persons to the relief camps.

(True Copy.)

(Signed) W. R. CORNISH, Surgeon-Major, F.R.C.S.,
Sanitary Commissioner for Madras.

MEMORANDUM.

I inspected this morning the famine-relief camps at the Red Hills and Yeddakancherry. The Hon. Sir W. Robinson was good enough to accompany me in this visit.

In regard to the Red Hills Camp there are a few points for the notice of Colonel Drever and for reference to Government, if need be.

On the 26th instant Mr. R. K. Puckle was good enough to direct my attention to the condition of the chuttrum and village near the calingula of the Red Hill tank which he had found in a very filthy state and crowded with diseased and enfeebled persons belonging to, or going to the relief camp. On arriving at this village just before daylight this morning, and before the people had begun to move much, Sir W. Robinson and myself found it crowded with famine people who were lying about huddled together wherever they could get shelter. The ground in front and at the back of the chuttrum was very dirty from bullocks and from being used as a latrine. A nullah running behind was very filthy, and the ground also in the village and between the village and the tank calingula.

The main room of the chuttrum itself was abominably foul. One dead-body had just been taken out of it, and others, we were told, had died there during the night.

The owner of this chuttrum, a Mussulman, said that, owing to the great amount of road traffic, halting of carts, and the influx of these famine people, it was impossible to keep the place clean with his small establishment of four servants (who collect the bullock manure and refuse for sale). He states he has already buried about 150 persons (strangers) who have died in the villages, and which deaths, I believe, are not included in the camp returns. The whole village has been brought into a most objectionable state in part by the people connected with the relief camps.

The small bazaar attached to the Red Hills Camp and the ground around it is also unclean and should be included in the general sanitary supervision of the camp itself.

As regards the chuttrum and village, Captain Wilson was desired by Sir W. Robinson to send off at once a party of sweepers to clean up the filth, to whitewash and fumigate, and to remove as many existing nuisances as possible. Surgeon A. J. Sturmer also was requested to inspect this locality from time to time and to report on it to the Superintendent.

The village is in the Chingleput District, but as its present state is partly referable to the proximity of a camp containing nearly 5,000 persons, we were of opinion that for the present emergency its sanitary needs and provision had better rest with the camp administration rather than with the local revenue authority.

(I had not time to inspect the other village near Mr. Teed's house, but the local sanitary officer should see it from time to time).

The Medical Officer suggests new hospital huts more in accordance with the present size of the camp, and we chose a site to leeward of the new camp.

Better hospital huts are wanted here.

The present latrine is too far off from the now enlarged camp or series of camps. We thought smaller enclosures nearer the several camps would prevent fouling of the surface and, being under the eye of the Superintendent, would always be kept clean.

The filling up of the hollow places where laterite has been quarried is very necessary to be continued as, do what we will, the people will use any hollow spot as a privy.

(Signed) W. R. CORNISH, F.R.C.S.,

28th February 1877. *Sanitary Commissioner for Madras.*

Sanitary arrangements of Madras Camps.

588. By degrees the medical and sanitary arrangements of these camps were made thoroughly efficient. In all the arrangements for the town camps Dr. Thompson, the Medical Officer of the 1st District, gave his hearty and valuable support, and the same may be said of other

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Medical Officers having relief operations within their districts.* At an early period the necessity for making special provision for emaciated infants became imperative. Special nurseries were formed and placed under trained female nurses who had special instructions in regard to the issue of milk diet to those requiring it. Hospital accommodation was extended as needed. Sanitary arrangements for night use in the sleeping huts were devised. Arrangements were made for vaccinating the unprotected of the inmates of camps and for the removal of able-bodied as they recovered to working camps.

589. All suggestions in regard to the Madras camps were made to the Commissioner of Police, Colonel W. S. Drever, who was in charge of famine-relief operations connected with the town. This officer not only promptly adopted every suggestion for the better sanitary provision of his camps, but throughout the month of February was in almost daily communication with me in regard to the various questions connected with the in and out-door relief. In this month, in accordance with my suggestion to Government for the more systematic relief of the town poor, additional kitchens or feeding depôts were established in various quarters of the town for issue of cooked food to those whose necessities had been investigated, and who held tickets entitling them to relief. All these operations were under Colonel Drever's superintendence, and the effective way in which they were carried out left nothing to be desired.

Private charity in Madras.

590. From the beginning of the distress in Madras, about October 1876, until the end of January 1877 private charity had largely exercised itself in the feeding of the poor. Native gentlemen of means and position opened kitchens on their own account, where, if the relief was indiscriminating, much food was also given away to the really deserving. The extent of this private charity, coupled with great activity of the grain trade, caused rumours to fly about the neighboring districts that in Madras there were "mountains of rice and rivers of ghee" awaiting the arrival of the hungry. The indiscriminate relief of private charity therefore at an early date caused great embarrassment to the local authorities by inciting the influx of the distressed poor to the town in unwonted numbers. In these private feeding-kitchens no attempt was made to issue a standard allowance of food. A certain amount of grain was cooked daily, and whether the applicants were 1,000 or 3,000, an attempt was made to divide the dole between the whole number. Those who were strong and robust, and who by sheer strength could scramble earliest into the feeding places, got best served, while the weak often had to put up with a scanty ration, or none at all. At one of these private charities the rations, in my opinion and that of Dr. Thompson's, did not equal ½ lb. of rice in each ball of cooked food. At the desire of Government, all but one of these private relief houses were closed, when arrangements had been completed for systematic relief of the resident and emigrant poor. In the relief house at Comaleswarrum managed by W. S. Venkataramanujulu Naidu the relief was all along administered in an exceptionally orderly and systematic way, and the personal supervision was excellent. It is quite certain the relief afforded by private individuals, as a rule, was too indiscriminate and too scanty to save the starving, while it encouraged the influx of wanderers to the town. In discussing the subject with the late Mr. R. S. Ellis, C.B., I suggested that if the charitable action of the wealthy Natives could be systematised and brought into harmony with the Government method of relief, the nobler impulses of the people to help their stricken brethren might do much good instead of harm. If, for instance, those willing to give grain could have been induced to send it to the several camps and depôts, it might have been issued to the people in meals sufficient to keep life in them, but the obstacles were considered to be too great, and no trial was accorded to this suggestion. Looking back on the past and considering that at a subsequent period in the history of the famine it was necessary to appeal to the resident rich to help in supporting the resident poor who did not come within the scheme of Government relief, I cannot help concluding that it was a grave mistake to dry up, at that early period of the famine, the

* The Medical Officers of the General Hospital, and of the 2nd and 4th Districts especially, had a vast amount of work thrown upon them in connection with famine medical relief.

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springs of private charity. That they were dried up was but too evident from the meagre subscriptions contributed by the Native community to the Town Relief Fund when it was opened in the month of July.

The discussion in regard to adequacy of wages on famine-relief.

591. Early in January the Government of India had delegated the Hon. Sir Richard Temple to visit the famine districts, and, amongst other suggestions, for reduction of the cost of famine. Sir Richard Temple in his minute dated 19th January, written after inspection of the relief operations in Bellary District, suggested that the basis of relief wages might be taken from the value of 1 lb. of grain per diem instead of 1½ lbs. as heretofore; that, in his opinion, one pound of grain a day might suffice to maintain life; and that the experiment ought to be tried, as Government was bound to do no more than sustain life.

592. The recommendation thus made had been provisionally adopted by the Madras Government after consideration, before I had an opportunity of seeing the minute, but on its appearance in the *Gazette of India* of the 3rd February, I addressed the following letter to the Madras Government in which I endeavored to show the extreme risk of reducing the wage-rate so dangerously low that the laborers would be unable to get sufficient food to keep up health and strength.

From Surgeon-Major W. R. CORNISH, F.R.C.S., *Sanitary Commissioner for Madras, to the Chief Secretary to Government, dated Madras, 13th February* 1877, *No.* 115.

In a minute, dated 19th January, by the Hon. Sir Richard Temple, and published in the *Gazette of India* (Supplement, page 106) of 3rd February, I find the following statement in regard to the quantity of food necessary to sustain the health of persons employed on famine-relief works in the Bellary District:—

"The present rate of wages is fixed at 2 Annas per diem for an adult and proportionately lower for women and children. This rate is fixed upon the supposition that it will purchase 1½ lbs. of grain per diem—a quantity which is deemed essential for a man while at work. There might, indeed, be a question whether life cannot be sustained with 1 lb. of grain per diem, and whether Government is bound to do more than sustain life. This is a matter of opinion, and I myself think that 1 lb. per diem might be sufficient to sustain life, and that the experiment ought to be tried. Possibly the gangs might not perceptibly fall off in condition. After a week or fortnight of experience it would be seen whether they so fall off or not: if they were to seriously fall off, then the point could be considered."

2. I have the honor, as the adviser of Government on public health questions in this part of India, to record my respectful protest against "opinions" which, although emanating from so eminent a public official as Sir R. Temple, are in direct contradiction to the accumulated testimony of scientific observers in every country in which this question of the quantity and variety of food essential to keep a laboring man in health and strength has been the subject of investigation.

3. While Sir Richard Temple expresses an individual opinion only, unsupported by evidence, scientific or otherwise as to the sufficiency of 16 oz. of cereal grain to maintain a laboring adult in health, it must be remembered that there is a large accumulation of facts in reference to this very question, and that these facts do not afford any support to such a theory.

4. One of the highest living authorities on all questions connected with dietaries is Sir R. Christison of Edinburgh. He is of opinion that the adult human body requires 35 oz. of dry food per diem, arranged so that *carboniferous* and *nitrogenous* principles may be in the proportion of *three* of the former to *one* part of the latter. (In Indian dietaries these proportions are but barely attained, and the tendency is always to a smaller proportion of *nitrogenous* food.)

5. In the year 1863 a careful inquiry was made by order of the Secretary of State for India, regarding the nature and quantity of food of the various classes of the people in India and of the prison dietaries. This inquiry was instituted at the instigation of the British Association for the advancement of science, and the reports of district Medical Officers and others on this point were submitted by myself to the Madras Government in the year 1864. It is a curious fact that amongst all the reporters there was this combined testimony, that the minimum grain allowance of a man in health and in work was *not less than* 24 oz., while the amount which a Native of good appetite was capable of disposing of, estimated by Natives themselves, was from 24 to 48 oz. per diem. For Bellary and Cuddapah the average daily allowance of dry cereal for a laborer was reported to be 33 and 48 oz., respectively,

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6. The physiological needs of the adult human body, according to all scientific investigators, necessitate the expenditure of from 140 to 180 grains of nitrogen in twenty-four hours *while the body is in a state of rest.* In ordinary labor about 300 grains of nitrogen will be excreted, and under great physical exertion, such as that of walking for many hours consecutively, from 500 to 600 grains.

Now, if this amount of nitrogen is not provided in food, it is obvious that the body must prey on its own tissues so long as any remain to be preyed upon, and this is, in fact, what happens when the food taken into the body is insufficient in quantity or quality to compensate for the constant waste that is going on in every organ and tissue.

7. The quantity of nitrogen in 16 oz. of rice may be from 68 to 80 grains; in *raggi or cholum* somewhat more, about 100 grains, and less than wheat (116 grains). To a certain extent, the low amount of nitrogen in cereal grain is supplemented in the dietaries of all classes by the use of flesh-meat, milk, cheese, &c., and in the vegetable feeders of India by the use of *pulses*, which are highly nitrogenous in their composition. The pulses, however, cannot supply the deficiency entirely, because in practice we find that their indigestibility prevents the people from using more than from 1 to 2 oz. per diem.

8. All our experience in Indian jails goes to show that there are things essential to health other than the bare allowance of 1½ lbs. per diem of cereal grains. These are (1) pulses, (2) meat or fish, (3) oil and condiments, (4) fruit or vegetables, and (5) salt. With a regulated minimum of these articles (taking care to comply with the primary physiological law of supplying enough of each class of food to compensate for the normal waste of the body under ordinary labor and exercise) we are enabled to keep the prisoners in fair health, and if this minimum of food from any cause is withheld or lessened for any time, the jail inmates begin to drop off from the very same causes that tell so severely on the famine-stricken people in our relief camps.

9. I may here remark that the quantity of food essential to maintain life is a question very much of the work expected to be got out of the eater. If we want to get a maximum of steam-power out of an engine we must feed the furnace liberally with coals, and in like manner a man would soon cease to have any power in his muscles if the food-supplies were inadequate. A feeble vitality might be maintained for a certain length of time on a diet the staple of which is a pound of rice per diem, but *labor* on public works on such a dietary is quite out of the question. As soon as the nitrogenous matters of the food cease to supply the normal waste of the muscular and other tissues, the body itself begins to die. If this slow death of the body goes on for too long a time, the Indian laborer finds himself precisely in the condition of the Edinburgh Physiologist (Dr. Stark, who tested in his own person the effects of a reduced dietary); he is the victim of a form of starvation from which no amount of subsequent liberality in feeding can save life.

10. Practically the important point is this: any dietary which contains less than 200 grains of nitrogen for Natives of India will not permit of severe labor or task-work. The jail diets in this Presidency are calculated to provide from 200 to 300 grains of nitrogen, and in certain instances these diets have had to be supplemented by extra meat and vegetables to prevent the men from falling into a low condition unfitting them for their daily task. Some confusion on this point seems to exist, and I think it very necessary to record that a *diet sufficient to keep life in a man when at rest* may be *wholly inadequate* to his needs when employed on tasks necessitating severe physical exertion.

11. It comes, therefore, to this: whether in the present dearth of supplies a man engaged on task labor and paid at the rate of 1 lb. of grain per diem and half an anna in cash can with the latter coin purchase a sufficient amount of nitrogenous nutriment (to say nothing of salt, oil, condiments, vegetables, and fire-wood) to make his daily ration equivalent to 200 grains and upwards of nitrogen. The reply is, simply, that neither in the shape of meat, fish, dhall, milk or butter-milk, can he procure a sufficiency to eke out the defects of his grain ration.

12. The ordinary food-grain of the Bellary District is cholum. In 1874 the price varied from 26 Imperial seers the rupee to 34 seers, and the average for the year was about 30 seers (60 lbs.) The present price is stated to be 8·25 seers per rupee. The rise in price, then, from 1874 is equivalent to a rise of the 4-lb. loaf of bread in England from 6*d.* or 6½*d.* to 2*s.*, and while the staple food has thus enhanced in value, it must be remembered that pulses, oil, vegetables, milk, butter and every other product depending on agricultural prosperity have increased correspondingly in value. While the value of all food-supplies has risen, the wage-rate has fallen, because the drought has thrown the great bulk of the agricultural laborers out of employ and many thousands are ready to work for a bare subsistence allowance. I foresee the gravest dangers to the health of the people in calculating that subsistence allowance of grain at 16 oz., and especially when that grain is deficient in nitrogenous constituents, as rice is known to be. If only a pound of grain can be given it will be better to give cholum or raggi than rice, these grains having a higher proportion of nitrogenous matter, and being moreover the food to which the poor are accustomed. I apprehend, however, that in the present scarcity, rice must be largely used to feed the people, and of this grain there can be no hesitation in saying that 16 oz. is insufficient for the maintenance of a laboring man.

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13. In my letter, No. 105, dated 7th February, I have pointed out that the effects of insufficient nutriment may not be immediately apparent, and in regard to the question of a pound of grain being enough, or not enough, we should never know the results until the mischief resulting from a deficient supply of nitrogenous food had gone so far that a retracing of our steps would be powerless to save life. I cannot too often repeat that it is the slow and gradual form of starvation by defective nutrition in the daily food that is the most difficult to deal with by after-remedies. It is easier in these cases to break down the vital powers than to build up or restore.

14. If the 1 lb. of rice be inadequate for the daily ration of a laboring man, it is sufficiently obvious that if he attempt to divide this amount of food with young children, or do without food for one day in the week (on Sundays), that the break-down in strength will come only the faster.*

Order thereon, 1st March 1877, No. 757.

The Governor in Council resolves to forward copy of Dr. Cornish's letter to the Government of India and the Secretary of State, with intimation that the Government are anxiously watching the effect of the scale of wages now in force, and have directed that weekly, or, if necessary, more frequent report of the results be submitted to Government.

2. They have also arranged that Dr. Cornish shall personally inspect some of the working gangs in the North Arcot and Ceded Districts and report the results of his observations.

3. The Governor in Council further resolves that a copy of Dr. Cornish's letter be forwarded to the Board of Revenue and every Collector and District Officer in charge of relief operations, in order to warn them of the importance of the anxious duty confided to them of watching the effect of the tentative reduction of subsistence allowance, and to direct that all Zillah Surgeons at stations in the vicinity of which relief works are in progress shall, as soon as the new scale of wages has been in force for one week, report to Government, after careful inspection of the laborers, whether they can or cannot detect any indication of loss of power or flesh in the coolies, and shall maintain constant supervision and forward periodical reports on the subject.

(Signed) W. HUDLESTON,
Chief Secretary.

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593. The correspondence just quoted will show my great anxiety to impress on the Government the dangers likely to arise from a chronic deficiency of food for the laboring poor. In regard to famine on a large scale I had no previous experience, but in the year 1857, while Civil Surgeon of Coimbatore, one of those local and unchronicled food failures occurred which brought vast numbers of poor starving creatures into jail, and on this occasion I had ample opportunities of studying the symptoms and results, including the morbid anatomy of those dying, of chronic starvation. On a subsequent occasion also in 1863, when the British Association required facts as to the nature and amount of food in ordinary Indian dietaries and in jails, it fell to my lot to issue instructions on the subject to the officers of the Medical Department, and to incorporate the inquiries and experience of the Civil Surgeons of Madras into an official report on "Food and Prison Dietaries" which was transmitted through the Secretary of State to the British Association for the advancement of Science.

594. As an outcome of the facts included in that report regarding the defects of existing jail diets, the Madras Government in 1865 did me the honor of consulting me in regard to the revision of the jail dietaries, and adopted my suggestions for their improvement, with the result that jail mortality at once diminished from about 107 per mille per annum to an average of 22 per mille for the eight years ending 1874 in which these dietaries were used.

595. And since my connection with the Sanitary Department in 1870, I have necessarily had constantly before me the influence of food and dietaries on health, and in special inquiries regarding particular jails have been able to trace more than once sickness and mortality to tampering with the regulated dietaries.

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* Curiously enough this letter and the Order of Government on it, which originated the discussion as to the sufficiency of Sir Richard Temple's rate of subsistence wages, has not been printed in the Parliamentary Blue books relating to famine, although the subsequent papers on the food controversy have been included.

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596. This personal explanation is necessary to show that in venturing to offer my advice on this all-important question of the amount of food necessary to sustain men at work, I did not come into the field as a mere amateur, but as one who, for a period of twenty years, had made the subject of Indian dietaries one of special study. As the professional adviser of the Madras Government on all public health questions, I deemed it my duty to submit to the Government the conclusions I had formed in regard to Sir Richard Temple's proposition to take the basis of the wage-rate as 1 lb. of grain instead of 1½ lb. according to all former practice and experience, even although the subject had not been referred to me for an expression of opinion.

597. The immediate result of the letter just quoted was an animated official controversy, joined in subsequently by almost the whole of the European and Native newspaper press in India, and the medical journals of Great Britain, as to the sufficiency or insufficiency of the proposed scale of food to sustain life. Sir Richard Temple replied to my letter above quoted in two " minutes, " dated respectively the 7th and 14th March. These minutes drew forth a rejoinder from me, dated 6th April, and a further minute from Sir Richard Temple, dated 18th April, to which, by direction of the Madras Government as far as the 8th paragraph of the minute was concerned, I replied in letter, No. 431 of 8th May. The whole of these papers having been published in the *Gazette of India*, in the Famine Blue Books, as well as in the Sanitary Commissioner's Volume of Proceedings for 1877, need not be reprinted here.

Consultation with Sir R. Christison, and his opinion.

598. Knowing the extreme gravity of the question, and feeling deeply the responsibility incurred by setting up my own protest against the approved action of the famine delegate, I took an early opportunity of sending a copy of my letter of the 13th February and of Sir Richard Temple's published minute of the 19th January to Sir Robert Christison, M.D., Baronet, of Edinburgh, the greatest living authority on dietaries, with a request that he would kindly advise me if I had, in his opinion, taken the correct view of the scientific aspects of the question of reduction of food-wages.

The following extract contains Sir Robert Christison's opinion :—

" EDINBURGH, 18*th April* 1877.

" DEAR DR. CORNISH,—" I received your letter a week ago, and the folio print yesterday.

* * * * *

" Mere practical experience is a dangerous guide to a dietary for a body of men. The fact is in this matter what is called practical experience is nothing else than loose observation. I could mention many striking instances from practical men trusting to their practical experience. But perhaps Sir Richard Temple will be satisfied with the history of the victualling of our troops for the Crimean War. The authorities at the Horse Guards provided the men with a dietary which proved to contain less real nutriment than their food in barracks or garrison at home, and not above one half of what was required for the labor and hardships which they had to undergo. Their hardships accounted of course, in part, for the sad result. But a sufficient dietary would have enabled them to resist these hardships, as had often been found before with our Navy seamen, exposed to equal labor, and quite as great hardships of a different kind.

" Sir Richard Temple will find the facts I mention in the Crimean Report of Sir John McNeill and Colonel Tulloch. But I may add that when Sir John on his return asked at the Horse Guards how they had fallen into such an error, he was told that they were not aware that there was any other way of valuing a dietary except practical observation.

" Nevertheless the analytical method was at that time well known to scientific men, and had been taught by myself for 22 years to large classes, and would have pointed out the error in five minutes.

" 2. But neither should scientific analysis be trusted to singly. It must be tested by practical observation, and the two methods together will supply trustworthy results.

" 3. Caution should be observed in applying the results of scientific enquiry in Europe to India. In all my investigations my subjects have been bodies of men of British race.

" Now, there is something in the constitution of the grain-eating Indian races, which seems in the course of ages to have adopted it to a very different dietary from that found most suitable here. There can be no doubt whatever that men of British race do not thrive so well, and are incapable of much labor, unless their dietary contain a fair proportion either of the mixed albuminoid principles of meat, or of albumen itself, animal or vegetable, or lastly of caseine in the shape of milk, but the long habit of ages seems to have rendered the

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Indian grain-eaters independent of these powerful aliments. Therefore you will see that a special inquiry is required for ascertaining the dietary of these people suitable for them in the various circumstances of life.

"I am not aware of any such inquiry* in India but one, and that is a report by Dr. G. C. Sutherland in 1871 on the Prisons of Oude.

"4. Dr. Sutherland on entering on duty as Inspector-General found the health of the prisoners very bad, the mortality being 10 per cent. In two years he reduced it to 2 per cent. This was brought about by various changes, and among these by increasing somewhat and varying their food. * * Of course, you know, nothing is more certain than that the nutriment in a dietary must increase with the amount of labor.

"5. In practically observing the effect of any experimental dietary, the main test is to weigh the men every 14 days. If there is a progressing diminution in a large proportion of them, the dietary is faulty and will ere long cause serious consequences.

"6. In applying European observation to India, account should be taken of the inferior bulk of the men. * *

"7. The last point which occurs to me is that a very meagre fare will serve for prisoners and the destitute poor for short terms of a week or a fortnight, but that it would be a grievous error to suppose that the same fare will answer for long terms of several months. This fact has been substantiated by careful observations expressly made here a few years ago."

(Signed) R. CHRISTISON.

"*P.S.*—On the principles already explained, it is my opinion that the dietary proposed by Sir Richard Temple is both insufficient in quantity, and *ill-chosen*."

599. This opinion of Sir R. Christison fully supported the advice I had tendered to the Madras Government as to the insufficiency of the wage-rate to enable the laborers on relief works to procure a sufficiency of food, and it was with the greatest satisfaction that I could appeal to one whose reputation as an authority on dietaries was supreme to show that the question was really one in which physiological knowledge should guide the administration in famine relief. A copy of Sir Robert Christison's letter was communicated to the Madras Government, but, being a private letter to myself, it was not brought on public record.

600. In connection with, but as an off-shoot of, the food controversy, Sir Richard Temple, when he had succeeded to the Government of Bombay, forwarded to the Government of India certain "Food Tables" prepared by Surgeon-Major Lyon, Chemical Analyser to the Bombay Government, which, in Sir Richard Temple's opinion, gave support to his theory that a pound of grain a day would keep a laboring man in health. These tables were published in the *Gazette of India*, and as the interpretation of Sir Richard Temple as to their meaning did not seem to me to be warranted by facts, I reviewed the subject in letter of 30th May 1877. This letter, with rejoinder from Surgeon-Major Lyon, also forms a portion of the famine literature of the *Gazette of India* and of the Parliamentary Blue Books.

Inspection of distressed districts.

601. In accordance with the instructions of the Madras Government, I began a tour of inspection of the famine districts of North Arcot and Cuddapah; but, at the request of His Grace the Governor in Council, proceeded in the first instance to Cuddapah and relief works on the Cheyar river on 2nd March, then to North Arcot and the Sub-division of the Cuddapah District above the ghauts, returning to Cuddapah by the end of March. My reports on these inspections will be found at pages 87, 97, and 102 of the Proceedings of the Sanitary Commissioner for 1877.

602. It is only necessary to quote here what I then recorded as my early impressions regarding the effects of diminished food-supplies on the laboring poor.

"2. The first gang we saw was employed in strengthening the bund of the large tank above the town of Cuddapah. This gang consisted of about 900 men, women, and children. They had been paid according to the new rates (calculated on 1 lb. of grain per diem for an adult) for about ten days. The gang contained a fair proportion of able-bodied men and women. We had them mustered in rows and examined them carefully. In all this gang there was scarcely one who had any superabundance of flesh. The younger women, who in ordinary times are plump and fleshy, had mostly lost these characteristics, while the growing lads and girls were deficient in muscle and looked as if they were but scantily fed."

* Sir Robert Christison was not aware that the subject had been thoroughly investigated in my report on "Food and Prison Dietaries" in 1864.—W.R.C.

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"3. According to my observation the earlier signs of defective nutrition were present in a considerable proportion of the persons employed in this gang. As the recognition of these signs is of great importance to officers employed on famine operations, I will here mention the more important of them:—

(I) The disappearance of fat and of the normal rounded appearance of the trunk and limbs.

(II) Softness and thinning of the skin from the absorption of fat usually found in the subcutaneous tissues. The skin is felt to be but loosely attached to the parts beneath.

(III) Softness and flabbiness of the muscles. This can be best ascertained by flexing the arm so as to induce a contraction of the biceps muscle. If the softness remains while the muscle is in a state of contraction, it is a sign that the texture of the muscle and its contractile power has been impaired.

(IV) 'Anæmia,' or general impoverishment of the blood. This condition of the body is very generally present in all cases of deficient nourishment. The unprofessional person can recognise it by the pallor of the face and lips and by a peculiar clearness of the white of the eye. If the eyelids are turned down so as to show the lining membrane which comes in contact with the eye, this will be seen to be quite pale and almost bloodless, whereas in a healthy subject it is of a delicate red color. In this condition the tongue is almost always coated in the centre with a white creamy fur, and the edges of the tongue show marks of indentation by the pressure of the teeth.

(V) Where the distress and bad feeding have been going on for some time, there is seen, especially in the women and growing children, a peculiarly sad expression of face, and the curved lines in the skin running from the side of the nose to below the angle of the mouth become very distinct and prominent.

"4. The first three of these indications of bad living were evident in about 75 or 80 per cent. of the people, and the characteristic anæmia in about 50 per cent., while the drawn expression of feature noticed under sub-paragraph V was present, perhaps, in about 25 per cent. I did not take the particulars one by one, but noted the proportion in regard to a few here and there, which seemed to represent fairly the general condition of the whole. I may state that all the gangs of this party were inspected.

"5. The conclusion I came to was that these people were far below the normal strength and condition of the laboring poor in this country, and that they would not be able to do task-work on the present rate of wages, and that any attempt to extract work on an inadequate scale of food would most seriously affect their vitality.

"6. In regard to the effect already produced by the reduced scale of wages, there has not been sufficient time to arrive at any definite conclusions. For the first effects of a reduced wages scale we must look to the condition of the old and infirm and to the young children, that is, to the *dependents* of the laborers who are incapable of earning a living for themselves, and who have to subsist on the portion of food that can be spared by the bread-earners. These classes are not to be seen on the relief works. If we desire to know how it fares with them we must seek for information elsewhere."

603. I had not been long engaged in the inspection of famine districts before the great truth came forcibly home to me that in that early period of distress the people on relief works afforded no criterion for judging of the extent and severity of the food pressure. Those who looked only at gangs of laborers working on roads saw famine prospects through roseate spectacles. They saw a peasantry of admirable physique, broad-chested, and muscular, though mostly spare of flesh, with only here and there obvious marks of wasting and debility. But if inspections were pursued into the hearts of towns and villages and in places where the poor wanderers congregated, the result was very different.

604. Unhappily, as I think, at this stage in the famine, public attention was too much concentrated on the condition of the actual laborers who, as a matter of course, must have been in tolerable physical condition to put in an appearance in the working gangs, and too little heed had been given to the condition of the non-workers. Here, for instance, is my account of what I saw at Cuddapah on 2nd March, before anything had been done by Government officers in the district for gratuitous relief.

"15. The Cuddapah poor relief house is mainly an effort of private charity, but has recently been assisted by a Government grant-in-aid. The building is a choultry on the outskirts of the town. Relief was commenced in October with 150 poor, and the daily numbers subsequently went up to 1,500, which included a considerable number of Mahomedan "Gosha" women. Efforts have been made to confine the relief here as much as possible to the local town-poor, and some of the Municipal Commissioners give much of their time and attention to the selection

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of proper objects of charity and to the supervision of the daily distribution of food. Each applicant for relief, after inquiry into his or her circumstances, is granted a numbered ticket, entitling the holder to share in the food distribution. The food (a mixture of cooked raggi and cholum in the proportion of three lbs. of grain, one measure, for five persons) with curry, &c., is distributed at sunset, and at the time of my visit there were more than 700 ticket-holders waiting for their daily dole; of this number nearly 300 were Mussulman women and children, including about 50 "Goshas." The people sat in rows according to their castes waiting the arrival of the food. It was at once evident that the more marked effects of famine were to be sought amongst people of this class rather than in the people who had strength to work on relief gangs. Here were gathered the old and infirm, helpless widows, deserted wives with large families, and children of all ages, and the condition of almost every one present testified to the discrimination of the managers of the charity in the selection of cases for relief.

"16. I am sorry to have to report that a large proportion of the 700 were very far gone in privation. As regards the old and very young, I should judge that 30 per cent. of them will be with difficulty kept alive for the next three months. The wailing of the infants (peculiar to famine-stricken children when the bowels are affected) and the subdued and saddened aspect of the women was just like what we hear and see every day in our Madras camps. The number of children unable to sit upright, and the attitudes unconsciously assumed by them in resting, constituted a true picture of famine as it deals with the young.

"17. The arrangements for the distribution of food were carried out in a quiet manner and without confusion. As a rule the people take their portions away with them, but some of the younger children had no little pots for their curry, and in that case received their allowance in the hollow of their two hands, and lapped it up eagerly on the spot.

"19. While the food was being distributed inside the choultry enclosure there assembled outside the gates more than one hundred women and children clamorous for relief. Provision to some extent is made for these casual applicants by cooking 10 measures (about 30 lbs.) of grain beyond the quantity assigned to the ticket-holders. Among these casual applicants were many who, one could see at a glance, were in a condition of great peril for want of a sufficiency of daily food. Their circumstances were inquired into and tickets issued to those whose necessities were considered great."

605. It was remarkable how rapidly the people began to be reduced in the dry upland districts where not only grain but every green vegetable had disappeared. Thus at Madanapalli in the Cuddapah District, when visited by Sir Richard Temple on the 2nd February, he recorded that he found that the laborers "looked to be in good physical condition, and it appeared that some proportion of them must have been quite able to support themselves, for a time at least, without Government aid. Hardly any of them appeared to be in a physically reduced condition." Seven weeks after, although these particular gangs had not been subjected to the reduced scale of wages but still received 2 Annas a day instead of 1½ Anna, I found by careful inspection of the gangs that 33 per cent. of the whole had become wasted and feeble from bad living. The condition of those who had gone beyond the power of working in Madanapalli will be seen from the following extract:—

"When Sir R. Temple inspected the relief house here on the 2nd February it is noticed 'some of the recipients seen by Sir Richard Temple at the Madanapalli Relief house were not yet in extreme destitution.' In my visit I was accompanied by Mr. Gribble, the Sub-Collector, Mr. Traill, the Executive Engineer, Lieutenant Money, on Special Famine duty, and Mr. Apothecary Ward, in medical charge of the station. The people were seated in rows awaiting the distribution of food. We passed along each row in turn, scrutinising the condition of every individual. Out of the whole 800 and odd we found only three women who appeared in moderately good condition and fit for work. Of these, two had three or four young children each (the children being much reduced), and the remaining one had managed to slip in at the back of the enclosure without a ticket in the hope of getting a meal. I did not see a single man in a condition fit for work.

"What we did see was a large group of individuals in every stage and variety of starvation. We saw old men and old women bloated with dropsy, some with their legs covered with bad ulcers; we saw others again—and many of them men and women in the prime of life—who were literally moving skeletons. We saw children of all ages in such a condition of emaciation that nothing but a photographic picture could convey an adequate representation of their state. We noticed children hanging listlessly on their mothers' hips, slowly dying of diarrhœa, and others recently born, merely loose skin and bone, atrophied, in fact, by the mother's want of food before they came into the world.

"It is of course impossible to state with any probable accuracy how many of these poor creatures will survive the famine. I expressed a hope to Mr. Ward that he might save 50 per cent. of them with care and suitable food. I trust that this estimate may be very largely exceeded, but, knowing as much as I do of the very deadly nature of the disease we define as

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'chronic starvation,' I am not very sanguine regarding the proportion that may be saved. I fear that a heavy mortality is inevitable.* The new scale of food for relief camps will give a better promise of saving life."

606. It is curious that throughout the famine, the distress in the highland taluqs of Cuddapah should have been so severe. The mortality in the relief camps in this section of the district was higher than anywhere else.

Standard dietary for relief camps instituted.

607. During this first tour in the famine districts my attention was directed to the arrangements for feeding the distressed in camps and relief houses. I found an extraordinary latitude prevailing. In one place 8 ounces of raw rice daily was supposed to be enough to keep a person alive. In another 10 ounces, in others 12 or 16, and as regards the quantity of pulse, ghee, vegetables, &c., these important articles of a dietary were issued according to the fancy of the person in charge, and there was nothing approaching uniformity. I therefore addressed Government on the importance of sanctioning a uniform scale of food for relief camps and houses, and gave my reasons for the adoption of the scale of food found by experience to be suitable for non-laboring prisoners in jails. In the same letter I also called attention to the fact that the people on works might suffer from irregularity in payment of daily wages.

608. As an impression seems to have gone abroad that the feeding in Madras relief houses was conducted on a sumptuary scale, I feel it incumbent on me in this place to record what I actually proposed and was approved of by Government.

From Surgeon-Major W. R. CORNISH, F.R.C.S., *Sanitary Commissioner for Madras, to the Chief Secretary to Government, dated Vellore, 10th March* 1877, *No.* 1.

I have the honor to suggest, for the consideration of His Grace in Council, that, in my opinion, the time has come for the laying down of general rules (applicable to all districts in which famine-relief works may be in operation) regarding, first, the mode of payment of coolies for work done and, second, the diet scale where the people are fed without labor.

2. In the few places I have already visited I find a diversity of practice in regard to the mode of paying the people for work done (I am not alluding to differences in the scale of payment, but simply to the way in which the wages are issued). In the Cuddapah relief gangs at Arconum and in Vellore the laborers are paid once a week only. Mr. West, on the other hand, pays the coolies employed on the Cheyar embankment every second day, or three times a week. Mr. Boultby, who hopes soon to have 20,000 coolies on the Arconum and Madras double line, proposes to pay them twice a week, or three days' pay at a time.

3. The point to be borne in view is whether a weekly payment is not attended with great risk in the case of people who flock to relief works and who may be really destitute. No bazaar-man will trust strangers without the deposit of tangible security, and those who may have neither clothes nor trinkets to pawn will, it may be inferred, fall into a dangerous condition of exhaustion for want of more prompt settlement of the wage account.

It may happen that coolies may be nine days at work before they get payment, and I apprehend there must be considerable suffering in some of the cases where the people are absolutely destitute.

4. Under the Order of Government, No. 329, of 31st January, when the weekly payments are made, it is the practice to fix the daily money wages according to the market price of grain on the last day of the week. With a steady rising market the cooly would derive an advantage, but with falling prices he would be a loser by the arrangement.

I am of opinion that this system opens the door for some abuse; that in the case of the really destitute it does not afford sufficient protection to the health of the people; and that the Government should, as far as possible, enforce payment not less frequent than every second day.

5. Where the daily wage allows a small margin above the price of half a measure of grain (1½ lbs.) as at Cheyar and on the railway at Arconum, a bi-weekly payment may perhaps suffice, but I feel confident that a weekly payment of wages is inadequate to meet the wants of the destitute poor who are paid on the scale recommended by Sir R. Temple.

The Relief Officers with whom I have spoken on this subject are of the same opinion.

6. My recommendation, therefore, on this head is to direct the attention of district authorities to the importance of uniformity of procedure in wage payments.

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* The representation made in March proved but too true. The deaths in the Madanapalli Relief Camp from April to December numbered 3,684, the average daily strength of the inmates being 1,661. The mortality was in the annual ratio of 2,217 per mille of daily strength.—W. R. C.

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7. I find that not only is there a diversity of practice in regard to the payments for labor, but that in dieting those who resort to relief camps for aid there is considerable variation,* and the differences in some cases are so considerable as to defeat the object of Government in establishing this form of relief.

* *Grain per Diem per Adult.*

	oz.
In Madras	24
„ Palaveram	12
„ Arconum	12
„ Vellore	16
„ Cuddapah Relief-house ...	10

8. In the arrangements for dieting the pauper population at the present time two points need careful consideration—

(*a*) The economical provision of sufficient nutriment to sustain life.

(*b*) The issue of food in such quantity and quality as to enable the famine stricken to regain their strength.

The diet scale in use in the Madras Relief Camps fulfils these conditions as well as any scale of food can be expected to do. Those who have not been too much reduced on admission have gained flesh and strength while on this diet, but, as might have been expected, the food has not prevented a very heavy mortality amongst the people whose health had been undermined by a long previous course of bad feeding.

9. In some of the camps, however, as at Palaveram, Poonamallee and elsewhere, the quantity of staple food-grain was scarcely sufficient to sustain life, and quite inadequate to the restoration of strength in those already enfeebled by low feeding.

10. The various scales of food in course of distribution have been drawn up mostly by officers practically unacquainted with the scientific bearings of the subject, and as the necessities of the people are pretty much the same in every district, it is important that the scale of rations should be as nearly uniform as possible, and that local authorities should be required to bring their arrangements for distributing cooked food into harmony with the principles laid down by Government.

11. While the scale of food used in the Madras town camps is well considered, and more liberal than any other scale I have met with, I think it is desirable to modify it so far as to bring it into harmony with the scale of feeding I propose for all relief camps outside. So long as the town camp inhabitants are better fed than those in Mofussil camps, the pauper population will continue to flock into Madras.

12. I would propose, therefore, as the standard of food in relief camps, something not very far removed from the allowance which has been found sufficient for the maintenance of non-laboring prisoners in jails.

This can be arranged by directing that the allowance of dry cereal grain per adult should not fall below (nor exceed) 20 oz. per diem, divided into two meals, and the allowance of dhall to be not less than 1½ oz. per diem for an adult. The other ingredients of the dietary, as laid down in Colonel Drever's report, I do not propose to meddle with, but in respect to the quantity of grain and dhall (the two essentials of the diet) I think the food in the Madras camps should be just the same as in all other camps.

13. While advising the use of a fixed quantity of grain and dhall in the dietary scales of the relief camps, I think I am bound, in the interests of the State, to recommend the employment of the cheapest grain in the market. In certain stations I find that cholum and raggi are cheaper* than rice, weight for weight. The crop of the latter grain is not perhaps a large one, but it is now coming into the market, and in many districts will afford food for two or more months' local consumption.

* From 10 to 20 per cent. In Vellore at present rice costs 1 Rupee for 17 lbs. while raggi can be got for 24 lbs the rupee.

14. If raggi or cholum can be bought at a lower price than second-class rice, I recommend their use in relief camps. Jail experience proves the wholesomeness of these grains and their nourishing powers, which are superior to rice, while, as a matter of fact, the people who are fed in famine camps are more accustomed to those dry cereals than to rice. In the Cuddapah Relief House the local committee issue a mixture of cholum and raggi, and the food is much appreciated.

15. My recommendations, therefore, in regard to the diet of relief houses and camps include—

(*a*) Uniformity in regard to quantities of staple articles of food.

(*b*) Use of the cheapest cereal grain for the time being. (In considering the question of cheapness, the cost of grinding and preparation, if any expenditure be necessary, must be taken into account).

(*c*) The fixing of a standard weight of 20 oz. of cereal grain and 1½ oz. of dhall as the full daily ration of adults.

(*d*) In relief houses where partial feeding is given to out-door local poor, one-half of these quantities should be the standard for a single meal of cooked food.

16. In the division of rations according to age it is also desirable to follow a uniform system. Considering the necessities of the growing body, I do not think that the allowance in some camps is quite equal to the wants of the young.

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17. I would, therefore, propose the following system for sanction of Government and for general adoption:—

All children above 12 years of age to be treated as adults in the distribution of food.
Do. between 10 and 12, ¾ ration.
Do. do. 5 and 10, ½ do.
Do. above 6 months, ¼ do.

This is a rough division, but in practice will give to a family a sufficiency of wholesome food. It is quite simple, and admits of easy calculation of the quantities of food to be accounted for.

18. I beg to assure His Grace in Council that I am not making these suggestions without due consideration as to their necessity. Already, owing to diversity of practice in feeding, I have seen some camps emptying, and others filling to overflowing; and quite recently whole gangs of people from the mofussil, who have been sent back to their districts by railway at considerable expense, have returned to Madras on foot, to live again at the public expense, because the work, or the diet, in their own districts did not meet with their approval. I am quite certain that unless Government lay down general principles, to be adhered to in regard to the matters noticed, that much confusion, waste, and possibly loss of life may result, and I lose no time in placing these views before His Grace in Council, so that, if the action of Government be deemed advisable, no time may be lost in requiring district officials to bring their relief operations into harmony with these views.

19. There is yet one other point in connection with the feeding of the poor in relief-camps to which the attention of district authorities may be directed. It is that the caste prejudices of the people may not be roughly disturbed in the arrangements for the distribution of cooked food. The majority of the applicants for relief belong to the so-called outcaste races, but they have their own usages and prejudices regarding eating food with one another, and in the distribution of food in permanent camps, I think it desirable that the several castes or sub-castes of the people should be permitted to group themselves according to their tribal habits. Attention to details of this nature may seem unimportant, but we have to bear in mind that neglect of them may cause really destitute people to stay away from the relief-camps until the time may have passed when the Government bounty can be effectual in saving life.

Order thereon, 20th March 1877, *No.* 1,159.

Dr. Cornish's suggestions regarding the payment of wages at least every second day are met by the terms of G.O. of the 15th instant, No. 1,088.

2. The Government quite concur with him as to the advisability of raising the rations in force at relief-camps to the minimum standard of 20 oz. of grain and 1½ oz. of dhall for each adult, to be given in two equal meals daily, where they are below that minimum; but before reducing the higher rations now given at the Madras and Red Hills Camp, wish to have his reasons for thinking they are more than sufficient.

3. At relief-houses where only one meal a day is given half the above ration will suffice.

4. Children above 12 years of age will be treated as adults, and of or below that age will receive the following proportions of a full ration:—

Between 10 and 12 years of age	... ...	¾
Do. 3 and 10 do.	... ...	½
Do. ½ and 3 do.	... ...	¼

5. With regard to caste prejudices, the Government see no objection to the different castes or sub-divisions of castes in relief-camps being allowed to group themselves together for their meals if they wish to do so.

609. The proposed scale of food gave 20 ounces of grain to an adult, but in the Madras Town Camps 24 ounces had been used, and the following letter and Government order explains why I wished to have one standard camp ration for the whole Presidency:—

From Surgeon-Major W. R. CORNISH, F.R.C.S., *Sanitary Commissioner for Madras, to the Chief Secretary to Government, Fort St. George, dated Madanapally, 24th March* 1877, *No.* 6.

With reference to the order of Government as per margin, paragraph 2, I have the honor to state that in recommending a standard scale of grain for the dietaries of relief-camps, I took as the basis of the recommendation the scale of grain food allowance for non-laboring prisoners in jails, as proved by experience to be suitable for non-laborers.

No. 1,159 of 20th March.

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2. The weight of grain given in the Madras camps is slightly higher (¼ lb. in excess) than the quantity usually allowed for non-laboring prisoners, and I recommended the reduction more on grounds of general policy than because I thought the food was in excess of requirements. It seemed to me that so long as the Madras camps were supplied with a dietary a trifle more attractive than the standard scales for outside camps, that the tendency would be to draw people from the Mofussil to the Presidency. The inconvenience of this flocking in of destitute persons has already been felt, and consequently my recommendation was intended merely to give the people of the districts no excuse for leaving their own relief-camps to be fed in Madras.

Sanitary inspection of distressed districts.

610. During the time I remained in Madras in February, the subject of better provision for the sanitary inspection of the famine area attracted the notice of Government, and I was requested to consult with the Surgeon-General of the Medical Department as to the means of carrying out a scheme for frequent sanitary inspection of the people. The difficulty chiefly lay in the fact of all Medical Officers of the department being fully engaged, and there being none to spare for special duties.

611 The Government of Bengal, however, having placed some of its Medical Officers at the disposal of the Surgeon-General, we were enabled to submit a plan of operations for the approval of Government.

612. The Order of Government, No. 1,284, of the 31st March, placed nine Medical Officers at my disposal to assist in a systematic sanitary inspection of the distressed districts.

The order in question states:—

"What is required is a thorough and prompt inspection of the distressed districts marginally noted, in view of information being furnished to Government with as little delay as practicable, of the general physical condition and appearance of the people, and the sufficiency of the State measures of relief. This end can be best attained by a sufficient number of experienced Medical Officers being deputed to assist the Sanitary Commissioner in making the inspection.

Bellary.	Chingleput.
Kurnool.	Salem.
Cuddapah.	Coimbatore.
Nellore.	Madura.
North Arcot.	

"3. His Grace in Council theretore requests that the Surgeon-General will nominate the officers, and that the Sanitary Commissioner will arrange with them the details of the inspection. The detailed reports of the inspecting officers will be in the form of diaries, and will be submitted to Dr. Cornish. * * * The diaries will be forwarded to the Sanitary Commissioner, with any remarks he may have to offer."

613. It was my desire to have been able to make a selection of officers for this important duty amongst those who had acquired experience in civil medical duty, but the needs of the Medical Department were so great that this could not be done without inconvenience or embarrassment to the Surgeon-General. The officers placed at my disposal were posted to the districts as per margin, and most of them had begun their duties in the latter part of the month of April.

Bellary ...	... Surgeon	Williams.
North Arcot ...	"	Lancaster.
Salem	"	Macdonald.
Chingleput ...	"	Gray.
Coimbatore ...	"	Rogers-Harrison.
Kurnool ...	"	Lawrenson.
Nellore	"	Sturmer.
Cuddapah ...	"	MacNally.
Madura	"	Maitland.

614. My instructions to the Sanitary Inspecting Officers were submitted for the approval of Government and were as follows:—

To

SURGEON ————————

SIR,

I have the honor, under instructions from the Madras Government, to request that you will proceed without delay to the district of————————, and report yourself, either in person or writing, to the Collector, and solicit his aid and advice regarding the most practicable method of exercising a sanitary inspection and supervision over the laborers on famine-relief works, relief-camps, and other centres of population where the inhabitants may be suffering from the effects of famine.

2. The main object of your temporary employment under my orders is that the Government may be furnished, without loss of time, with accurate information regarding the health of the people in the famine districts, and especially the circumstances and physical condition of the laboring poor employed on relief-works, and the condition of the weakly and diseased in relief-camps and in receipt of village relief.

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3. To accomplish the duty before you, it is necessary that you should visit each taluq of the district and note accurately what is being done for the people, and the sufficiency or otherwise of the measures of State relief. In all journeys and tours you will be guided by the advice of the district officials in regard to order of inspection and direction of tours.

4. You will be required to keep a diary of your proceedings, and to forward to me weekly such extracts therefrom as may illustrate the nature of your work in the preceding week, or contain any information the Government may desire to have.

5. You will also furnish to the Collector of the district such extracts from your inspection notes as may seem to need immediate action on the part of District authorities, and the subject of any correspondence with the District authorities must always find a place in your diary. The weekly extract of your diary should be written on paper with a blank margin of one-half of the sheet, and should be despatched to me every Monday.

6. With regard to the subjects requiring notice at your hands, you will understand that the Government desires early and accurate information on the following points :—

(a) The physical condition of the relief laborers, of persons fed in relief-camps, and of the people generally, so far as your opportunities of inquiry will permit.
(b) The condition of the water-supply in villages and camps inspected.
(c) The state of the food-supply, and especially the kind of grain in present use, as well as of those used in ordinary times, and notice of any unusual articles of diet.
(d) The nature and amount of epidemic and other diseases amongst the inspected population.

7. As to the physical condition of the people, your attention is directed to the following heads :—

I.—The prevalence of anæmia as indicated by unnatural whiteness of the sclerotic and conjunctiva, pale lips, creamy tongue, palpitation, &c.

II.—*Physique.*—Note especially the condition as to subcutaneous fat, state of skin, muscular development, and signs of wasting and emaciation. Where practicable, selected groups of laborers should be weighed and measured from time to time, to note the effect of famine wages in keeping up health and strength.

III.—Note especially the condition of young children. Also as regards *females*, whether the breasts are well developed, and in young girls from twelve to fourteen, whether puberty appears to have been arrested by scanty living. In the gangs of working coolies, children under seven years are allowed three pies each per day. Note the number of children of these tender ages brought to the works.

IV.—Some mothers during the famine have given birth to children in a condition of extreme atrophy. Make observations on this head whenever you see infants in arms. Also note whether many or few of the women appear to be pregnant. (One effect of famine is probably to diminish for a time the fertility of the people, and observations are needed on this head).

V.—In the relief-camps you will find a large number of old and worn-out people, whom it will be almost impossible to save. In the extreme stages of famine you will find both the old and young suffering from a form of diarrhœa, which is a true famine diarrhœa dependent on thinning and ulceration of the lower bowel. Many will be dropsical, others affected with sloughing ulceration of the limbs. With regard to these people it is important that they should be cared for and kept as comfortable as circumstances permit.

VI.—Government has recently sanctioned a standard daily allowance of 20 ounces of cereal grain and 1½ ounce of dhall besides the ordinary curry-stuff, ghee and vegetables for the feeding of persons in relief-camps. You are desired to see and report in regard to each camp you visit if these quantities are given for adults and according to the authorised scale for children, and you will take measures for testing quantities of food so as to see that the Government bounty reaches the people for whom it was intended.

8. You will report if there is medical aid for the sick in the various camps, and, if so, confer with the Medical officer in charge regarding any suggestions for improving the arrangements, sanitary and medical, noting in your diary any suggestion you feel called upon to make.

9. In recording the results of your inspections of laborers, &c., be good enough to remember that the Government do not want general statements so much as reliable facts and figures. You are advised to jot down in a note-book the numerical facts at the time of inspection, and to bear in mind that a few gangs well and carefully inspected may give more information than a large number gone over in haste, and without attention to detail.

10. In the carrying out of these inspections, you will be assisted by the advice of District officials and the experience of local Superintendents of Relief Works.

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11. You are expected to exercise tact and discretion in your intercourse with local authorities, and you must regard yourself for the time being as the local representative of the Public Health Department.

12. In all cases of doubt or difficulty as to the advice you should tender, or as to your mode of procedure, please refer the facts to me for disposal.

(Signed) W. R. CORNISH,
Sanitary Commissioner.

615. The institution of this system of sanitary inspection of the famine districts was of great use to local authorities, in bringing to notice irregularities in camp management, in dieting, and in village relief, and it kept the Government practically acquainted with the condition of the people, and the working of relief measures from week to week, throughout the worst part of the famine. This special establishment was sanctioned by the Government of India in the first instance for a period of three months, ultimately extended to six months. At the end of September I was able to report that the services of five out of the nine Inspectors might be dispensed with, while the remaining four were kept on until the close of the year.

616. Considering that the officers employed on this particular duty were not specially selected, it speaks well for their training in sanitary work at Netley, that all should have done a very laborious and disagreeable duty with more than efficiency.

Surgeon McNally.
Do. Williams.
Do. Sturmer.
Do. Maitland.
Do. Lancaster.

617. The officers named in the margin were conspicuous for zeal and thoroughness in their work, and it affords me much pleasure in bearing this public testimony to the sense I entertain of their valuable services to the Government. The officers employed on this duty have acquired an experience of famine that may be regarded as exceptional, though I trust that no such grave occasion may again arise for the utilisation of their special experience.

618. Surgeon McNally had a narrow escape of his life from cholera contracted in the execution of his duty. Surgeon Maitland contracted a severe attack of dysentery, from which he has had to go on leave to Europe. Other members of the inspecting staff suffered more or less in health from the exposure and hardships inevitable to constant and rapid movement amongst the famine-stricken poor.

Revision of hospital diet for relief-camps.

619. On an inspection of the inmates of the Monegar Choultry Camp on the 9th April, my attention was directed to the fact that a considerable number of the people in the camp were suffering from a peculiar condition of the mucous membrane of the mouth and tongue, and were generally in a low state of health, not improving to the extent that was anticipated after some weeks or months of the camp diet. The food here had all along included 1¼ lb. of rice per diem for an adult, with dhall, vegetables, ghee, and curry, including something less than 1 oz. of meat. Yet it was evident that the ration was defective in some essential ingredients of food, and that the people were falling into a low cachectic state. Frequent inspection had satisfied me that the rations were actually consumed by the people. My own view was that the diet was deficient in vegetables and animal food, and that a change was needed; but bearing in mind the financial aspects of the question of a general increase in camp rations, I suggested to Government that before making any change, the independent opinions of the Surgeon-General, Indian Medical Department, and Dr. vanSomeren, the Deputy Surgeon-General, should be asked as to the propriety of the measure. The Madras Government at once nominated Surgeon-General C. A. Gordon, M.D., C.B., of the British Medical Department, who during the siege of Paris had experienced in his own person some of the effects of short rations, and Surgeon-General G. Smith, M.D., to visit the Madras relief-camps and to report on the necessity of the proposed increase of diet. These gentlemen not only confirmed my own view as to the necessity of an improvement of the dietary, but recommended a more liberal scale of food than I had suggested.

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The following is my letter, and extracts from the report of the Committee, and Government Order thereon :—

MADRAS, *9th April* 1877.

Before taking action on Proceedings of Government, 31st March, No. 1,285, I have the honor to suggest, for the consideration of His Grace in Council, that the opinions of Surgeon-General G. Smith and Deputy Surgeon-General W. J. vanSomeren be obtained on the present condition of the people in the Monegar Choultry and Red Hills Camps, who have been receiving 1½ lb. rice, besides dhall and vegetables in their diet, for some months past.

2. I have just completed an inspection of the Monegar Camp, and I regret to state that I do not find the condition of the people to be at all satisfactory. While a great many of the inmates have put on flesh of some sort, they appear to me to be, as a rule, in a very poor condition of health. Their muscles are soft and flabby, and they are decidedly anæmic. I fear there are very few of those who have been fed some months really fit to do a day's work.

3. But the most marked feature in the people of this camp is a peculiar condition of the tongue. In many cases the tongue is quite denuded of its usual coating, and is preternaturally clean, while the lining membrane of the mouth is unusually red and tender. In others there is a redness of the tongue at the edges, and cracks and fissures on the fur of it, denoting an irritable condition of the mucous membrane throughout the intestinal tract.

4. I observe, too, that a considerable number in the camp have spongy and discolored gums, indicative of approaching scurvy, and of some deficiency in the diet.

5. The young children in the nursery are nearly all dropsical, and most of the old people are in the same state. The mortality amongst these is still very high, and likely to continue high, so far as I can see. If an epidemic of cholera broke out in the camp just now, I believe the mortality would be very serious indeed.

6. The diet of this camp, while ample as regards grain, is defective in regard to the amount of green vegetables and animal food; and I cannot help thinking that the low condition in which I find the people of this camp is dependent on the nature of their diet, which has been almost exclusively a grain and pulse diet with condiments.

7. In the gigantic task of feeding the destitute poor, I have hitherto hesitated in recommending any thing beyond a bare subsistence allowance of grain, pulse, and condiment. But the condition of the people warns me that if life is to be saved, some measures must be adopted to provide animal food in the shape of butter-milk, meat, or fish, to eke out the defects of the present scale of rations. I know that my views on this subject are subjected to keen criticism, and on that ground I should prefer that Government seek the independent conclusions of the gentlemen I have named before making any change in the feeding in relief-camps.

8. My own suggestion is that, in reducing the grain from 24 to 20 ounces, measures should be taken to ensure a more liberal allowance of green vegetables and meat, or fish, to the extent of 4 ounces for an adult three times a week, and that the effects of the change of dietary should be carefully watched and recorded.

9. I may remark here that the present condition of these people, who have been fed on 1½ lb. of grain daily and 1½ ounces of dhall, is the best practical commentary on the proposal to consider 1 lb. of grain as the basis of wages that I have yet seen. This dietary has been in force for more than three months, and the people, as a whole, instead of thriving upon it are, in my opinion, deteriorating in health.

Order thereon, 10th April 1877, *No.* 1,385.

The Governor in Council resolves to refer the Sanitary Commissioner's letter to the Surgeons-General of the British and Indian Medical Services, with the request that they will take an early opportunity of inspecting the paupers at the Monegar Choultry and Red Hills Camps, and will report, with as little delay as possible, their opinion of their present condition, and whether the diet they are now receiving is sufficient to keep them in health.

Report of Drs. Gordon and Smith on Monegar Choultry Camp.

* * * * *

CONCLUSIONS.

Having entered at some length into the preceding details in regard to the conditions observed by us in respect to the paupers in the relief-camp at the Monegar Choultry, we arrive at the following conclusions from the facts observed and here recorded, *viz.* :—

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As to the present condition of the paupers :

(*a*) In the mass the physique of the inmates is inferior.* The ulceration of the mouth already recorded indicates the existence of morbific changes in the lining membrane of the intestines, which we believe will sooner or later render impossible absorption and assimilation of food, induce diarrhœa, and through it death of those so affected, if permitted to advance.

(*b*) In a considerable proportion of instances the prominent abdomen, the œdema of eyelids and feet, point to a cachectic condition of body such as are the concomitants of starvation, or insufficient or improper food, and which, from the experience of the past, we are justified in believing will, if unchecked, ultimately terminate life.

(*c*) Some of those admitted to the relief-camp in the early period of the famine, that is, prior to a date six weeks ago or thereabout, have held their own, although we are unable to say they have actually gained in condition. Some of these, to all appearance, are fit for work; some of them do actually perform work now, and several expressed themselves willing to take any labor they could obtain. We were informed at the time of visit that a considerable number of this class were held ready to be sent away to relief-works when these became available for them.

(*d*) There is a considerable number who, although not actually suffering from disease, seem so reduced in physique that their reserve stock of power is exhausted. Of these some appear to be on the borders of illness, and unlikely to be fit for labor if permitted to remain in their present state.

(*e*) Although a considerable proportion of infants and children appear to be in a tolerable condition, and some actually well, there is another class, and it is numerous, in which, to judge from their impaired physical condition and cachectic state, we doubt if anything will enable them ultimately to survive.

2. *As to whether the diet the paupers are now receiving is sufficient to maintain them in health :*

(*a*) We consider that with respect to paupers admitted into the relief-camp during the early part of the existing famine the particular ration of food sanctioned has so far enabled a number of them to hold their own. Even with this class, however, we doubt whether the state of health in which they now are is likely to continue much longer under existing conditions of diet, &c.

(*b*) In the cases of persons presenting the deranged state of the tongue, gums, and general health already detailed, we consider the present scale of diet altogether insufficient; this insufficiency, in our opinion, being partly in its quantities, and partly in the nature of its constituents.

(*c*) With regard to paupers more recently admitted, and who have been for a considerable time previous exposed to the severity of famine, we consider the present ration to be insufficient to maintain health. In the case of such persons the natural reserve of power possessed in greater or less degree by all men, had been diminished to an extent varying with the severity with which scarcity or want had affected them; a considerable number of them have become affected with the characteristic derangement of the digestive organs, indicated by the signs already noted, and the functions of digestion and assimilation in them are proportionally impaired.

(*d*) For the women who are now nursing infants at the breast, the present scale of diet is insufficient to maintain them in health. In their particular case it is insufficient even to a greater degree than in that of men; with the former, not only does it become necessary to support the physical powers of the individual as with the latter, but over and above this material has to be supplied for transformation into food on which growth and health on the part of the nursling infant are dependent.

It is an important question in laying down a diet scale what are the purposes to be fulfilled by it in respect to the person partaking of it, that is, whether he shall be maintained only at a point of mere existence without a reserve of tissue and power to enable him, when the time comes, to undertake ordinary labor, or whether he shall be preserved in a condition sufficient to maintain this reserve, and enable him without detriment to his physique to resume hereafter his ordinary occupations.

For the first-mentioned purpose the scale now in use seems to be sufficient in respect to those who have only suffered from the effects of ordinary poverty or scarcity.† For such, however, as have been lowered by the pressure of want and famine, it is deemed to be altogether insufficient. Our opinion is that, in order to maintain the health of all according to the standard we have indicated, a rate of diet considerably above the present is necessary.‡

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* *Note by Surgeon-General Smith.*—All are more or less anæmic; many are cachectic as well as anæmic.

† *Note by Surgeon-General Smith.*—Add, although the dietary is defective as regards certain necessary elements of food.

‡ *Note by Surgeon-General Smith.*—We deem it also necessary that the dietary indicated shall avoid sameness, and be constructed so that existing pathological tendencies in the pauper population of the camp be, if possible, checked.

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In respect to all classes now in camp, we consider the scale laid down for ordinary non-laboring prisoners to be the most suitable with a few trivial modifications as noted below, *viz.* :—

	lb.	oz.	drs.
Rice	1	8	0
Vegetables	0	4	0
Dhall	0	2	0
Mutton, excluding bone, or equivalent in fish (three times per week)	0	3	0
Salt	0	1	0
Tamarind	0	0	8
Ghee (clarified butter) or oil	0	0	8
Curry-powder	0	0	7
Onions	0	0	8
Garlic	0	0	4

Surgeon-General Smith recommends on non-meat days 6 ounces of butter-milk.

We consider that all women suckling their children ought, for purposes of health, to have the above ration daily. That children under the age of 12 should have one-half of it; above that, the entire ration.

C. A. GORDON, A.M.D.,
Surgeon-General, British Medl. Service,
Madras Presidency.

GEORGE SMITH, M.D.,
Surgeon-General, Indian Medl. Dept.,
Madras Presidency.

MADRAS,
19*th April* 1877.

CONCLUSIONS OF SURGEONS-GENERAL GORDON AND SMITH.

* * * * *

1. *With regard to the present health of the Paupers in the Relief Camp at the Red Hills :*

(*a*) We consider that those who have been for a considerable period in camp are to all appearance in good health.

(*b*) Those more recently admitted exhibited a more or less abraded tongue, and in some instances other indications of deranged health. With respect to this class we are of opinion that grounds exist for anticipating that, in the event of their circumstances not being quickly ameliorated, their condition will rapidly become worse, that considerable mortality will occur among them, and that those who survive will be in a condition such as will unfit them to resume labor.

(*c*) With regard to children and young persons we entertain very grave apprehensions. The particulars already given justify a belief that both these classes will hereafter deteriorate in health even to a greater extent than has been the case up to the present time, and a very large number perish if conditions remain as they now are.

2. *As to whether the diet they are now receiving is sufficient to keep them in health :*

(*a*) It is beyond question that a large number of persons, particularly those who were admitted into the Red Hills Camp shortly after it was first established, have retained their health and are at the present time in good physical condition. That this is the case is no doubt to a large extent indicative that their diet has been sufficient to keep them in health. We have seen, however, that many persons have been able to supplement it in various ways, although in none apparently to any great extent.

(*b*) In respect to paupers more recently admitted and whose conditions have been recorded in the preceding paragraphs, we consider that the present diet is insufficient for any other purpose than simply to keep them alive for the time being, but insufficient either to restore their original physique or supply them with a reserve to enable them to resume labor when the time arrives for them to do so.

(*c*) In the case of women who are suckling children we consider the present scale of diet insufficient for their double requirements.

(*d*) For the young we consider that the diet is *unsuitable* in kind, No doubt it would be practicable to give them more appropriate diet were they taken into hospital; this measure is however obviously impracticable by reason of their great numbers, and the immense establishments including *personnel* that would become necessary.

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(e) For these three classes, *viz.*, (*b*), (*c*), and (*d*), we consider the most suitable diet to be that which we have recommended in respect to the paupers in the Monegar Relief Camp.

To it accordingly we beg to refer.

(Signed) C. A. GORDON, A.M.D.,
Surgeon-General, British Medl. Service,
Madras Presidency.

(Signed) GEORGE SMITH, M.D.,
Surgeon-General, Indian Medl. Dept.,
Madras Presidency.

MADRAS,
20*th April* 1877.

620. The Order of Government of 5th May directed the scale of food recommended by Surgeons-General Gordon and Smith to be adopted in all relief-camps in supersession of the scale previously recommended by myself.

621. This scale of food had been generally introduced into relief-camps, and for the more advanced cases of privation there is no doubt it was admirably adapted for the restoration of health. But in many places there was a difficulty in providing sheep or goats for the animal food, so many of these animals having been used for food during the early period of the famine, and the issue of this diet indiscriminately to all inmates of camps undoubtedly tended to increase and retain the able-bodied in camps, who should have been on relief-works.

622. In July I received a summons to attend a meeting of the Madras Government in the Council Chamber, and His Grace the Governor having requested my opinion in regard to the necessity of continuing the above diet for *all* camp inmates, I gave, as my decided opinion, that the superior diet should be retained as a hospital diet for special cases for those who had been much reduced, and that the ordinary food of those in relief-camps should consist of 20 ounces of grain, two of dhall, and condiments and vegetables, as recommended by me in March.

623. In accordance with the advice thus tendered to the Madras Government, the following G.O., No. 2,372 of 24th July was issued :—

Proceedings of Government, dated 24th July 1877, *No.* 2,372.

The variations which have gradually grown up in the rates of subsistence allowance given in different districts at relief-camps, at relief-houses, to gosha females, and in villages, render it in the opinion of Government advisable to lay down distinctly the rates which the Government desire to be adhered to throughout.

2. His Grace in Council, therefore, resolves, in supersession of all former orders on the subject, to prescribe the following rates of subsistence allowances :—

(*a*) In relief-camps—

To persons receiving special treatment under medical care, a diet not exceeding that recommended by Surgeons-General Gordon and Smith, *viz.* :—

	Per diem. oz.	drs.	
Raw grain	24	0	To be cooked before distribution.
Vegetables	4	0	
Dhall	2	0	
Meat or fish (three times a week)	3	0	
Salt	1	0	
Tamarind	0	8	
Ghee or oil	0	8	
Curry-powder	0	7	
Onions	0	8	
Garlic	0	4	

To all others in relief-camps a diet not exceeding ... { 20 oz. of raw grain. 2 oz. of dhall. } Do. do.

Collectors should take care to fix the camp diet so that it does not attract persons on village relief from their homes.

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(*b*) At relief-houses—

In districts where there are no relief-camps and in cases where the relieved persons are entirely dependent on State aid	Two meals of cooked food per diem.
In all other cases	One such meal per diem.
The meal in all the above cases at relief-houses is to consist of	8 oz. of raw grain. 1 oz. of dhall.

(*c*) To gosha females and to persons relieved in their own villages—

To each adult or child above 12 years	A daily payment, in cash, sufficient at the taluq kasbah rate to purchase 1 lb. of rice.
To every child of 12 years or under	A daily payment, in cash, sufficient at the same rate to purchase half a pound of rice.

624. These instructions have continued in force as regards camp diets up to the present time. According to my experience the Native Medical Officers in charge of camps did not, as a rule, exercise sufficient discrimination in keeping suitable cases on the higher scale of food. In my inspections I have had frequently to insist upon the transfer of persons from the low diet to the higher scale, as the only chance of bringing them into a condition to resume work. The lower diet scale, without meat, just sufficed to keep people alive who had not suffered much emaciation; but where there had been great wasting, only the higher scale of food served to restore the people to a condition to enable them to resume their occupations. As a mere matter of economy the hospital diet, with meat, was an advantage, as it enabled Relief Officers to restore quickly many who otherwise could not have gained strength to work. The greatest extravagance in this matter is the method of feeding that allows the people to fade away until recovery is hopeless.

Alteration of scale of wages for relief laborers.

625. Throughout the months of March and April the Madras Government continued to watch with great solicitude the effects of the reduced rates of wages introduced by Sir Richard Temple for those who could not execute 50 per cent. of an ordinary task. It is true that, owing to my representations, the reduced wage had been paid on seven days instead of six, and that an extra allowance had been granted for the support of each child under seven years of age, and that in this way the mischief of the reduced wage had been minimised; but with the increasing heat of the weather prices steadily rose, and the condition of the people on works became more and more feeble, and the almost universal testimony of Relief Officers went to show that the people were not being kept in good physical condition. On the 22nd May 1878, His Grace the Governor in Council issued the following order, cancelling the reduced scale of payments :—

"The attention of Government having been closely given to the subject of the sufficiency of the scale of wages established by G.O. of 31st January 1877, No. 329, Financial Department, and the weight of the direct evidence being decidedly adverse to the continued maintenance of the lower rate, which evidently has only very limited operation in Bombay, if any, and which the Mysore authorities have never introduced, His Grace the Governor in Council resolves to direct that the No. 1 rate of wage in the above scale be made of general application to all famine works; the task to be exacted being not less than 50 per cent. of a full task estimated according to the physical capacity of the individual laborer in his normal condition, and with reference to the circumstances of the work, such as nature and condition of the soil, proximity of water both for work and drinking purposes, accessibility of site from lodging place, &c.

"2. The Government consider that laborers who are unable to perform this amount of task should not be in the labor gangs at all, but should be on specially light work or in a relief-camp until strong enough for effective labor.

"3. All nursing mothers employed on works will be paid as adult males, and all working boys and girls above 12 years of age will be classed as adults.

"4. All children of laborers under 7 years of age will be excluded from works, but allowed a quarter anna daily subsistence allowance.

"5. The full rate of wages will be paid for Sunday, but no task will be exacted for that day.

"6. Wages should be disbursed not less frequently than once in three days.

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"7. Piece-work at ordinary district rates and petty contract-work, when the laborers associate themselves in family or village gangs under proper and, as far as possible, under professional supervision, should be encouraged as much as possible; but the system of large contracts by outsiders for famine works is disapproved.

"8. The Governor in Council relies on the Collectors to give the fullest and most speedy publication to these orders, so as to allow of their being brought into operation with the least possible delay. They will be telegraphed in abstract to all Collectors."

626. Very shortly after the promulgation of this order another measure was instituted for the regular relief in their own villages of those who were unable to work. It was obvious that the relief-camps opened in the various districts, while they received and cared for many wanderers, did not touch the cases of the respectable caste-poor who preferred staying quietly at home, awaiting the final end of their misery, rather than mingle in the promiscuous herds of the relief-camps.

Village-relief.

For cases of this description, and the old, orphan children, and such like, the village-dole was established.

627. The village organization, however, in practice was not faultless, and the good intentions of Government were often frustrated by the carelessness and indifference of the village servants in the selection of cases for relief. The reports of the Sanitary Inspecting Staff in regard to the operations for village-relief show that many were left out from insufficient causes, that in some cases the relief was irregular, and that dangerous delay often occurred in bringing suitable cases on the lists. With a good organization for the inspection and control of village-relief, there can be no doubt that the system is well calculated to save life and suffering. It is unsuitable only in those cases in which the remote villages are unprovided with food, and in such instances the migration of the poor to the established food markets, and their relief near the bases of supply, are imperative:—

Proceedings of Government, 28th May 1877, No. 1,830.

His Grace in Council finds from the reports of various officers that a strong dislike prevails amongst the distressed poor in villages to removal to the relief-camps provided for their use at convenient centres. The Governor in Council, moreover, fears that the system now in force tends to induce and foster those wandering and unhomely habits amongst the distressed, which render the distress more difficult to detect and more costly to relieve—habits which it is on every account most desirable to discourage and check.

2. His Grace in Council, therefore, authorises all Collectors to make arrangements to relieve, in their respective villages, any distressed persons who are fit objects for transmission to a relief-camp, but are reluctant to leave their homes, and to issue to them, so long as they need it, a continuous daily money-dole through the village officers, instead of removing them to central camps.

3. The head of the village will be directed to enter the names and circumstances of all such persons in a register, and to relieve them at the rates hereinafter provided until the arrival of the Village Inspector. Each case will then be carefully inquired into by that officer; and, if worthy of continued relief, a ticket will be issued to the distressed person authorising him to receive from the village head the sanctioned daily money-dole. The name of the recipient, his number on the register, the date of his admission to relief, and the name of his village should be entered on the ticket. The dole should be issued daily not later than 8 A.M. The Village Inspector will be instructed to inspect each recipient on his first and subsequent visits, and to report any change for the worse or other casualty; to satisfy himself, on the one hand, that the dole has been properly and regularly paid, and, on the other, that no undeserving cases have been added to, or allowed to remain on the register.

4. The Inspector will be required to sign the register and the recipients' tickets on each visit. The Inspector will also satisfy himself as to the current price of food-grains, and report to the Collector any material change which he may ascertain, adding any remarks regarding the conduct of the payment arrangements which he may consider necessary.

5. His Grace in Council further authorises Collectors and officers in charge of relief-camps to arrange for the transmission to their homes of such inmates as desire to return to them, with their families, if they are in a fit state of health to proceed beyond the reach of the medical aid and special relief provided at the relief centres. The same provision may be extended to distressed persons seeking admission to camps and relief-houses without requiring residence.

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6. It will probably suffice, as respects villages within the same district, for the officer in charge of the camp or relief-house to grant certificates, accompanied by sufficient food or batta for the road, addressed to the heads of the villages from which the inmates come, authorising them to enter the distressed persons in their lists, and to issue to them the daily money-dole on arrival in their respective villages. Notice should at the same time be sent to the Tahsildars of the taluqs in which the villages are situated for transmission to the Village Inspector of the circle, whose duty it should be to visit forthwith any village to which any considerable number of distressed persons are so relegated and satisfy himself of the propriety of their claims. When the number is small, this inspection will take place in the ordinary course of the Inspector's tour.

7. When persons belonging to adjacent districts have collected in relief-camps and centres, and are desirous to return to their own districts and villages and there receive the village money-dole, arrangements will be made, through the officials of the district in which are situated the villages to which the inmates wish to return, for their safe transit to their respective villages, the necessary batta for the journey being supplied by the officer in charge of the camp or centre.

8. His Grace the Governor in Council resolves to authorise officers to issue the money-doles at not less than

Anna 1-2 for each adult, male or female, and
„ 0-6 for each child below 12 years of age.

These rates may require to be raised in case of any material change in price of food-grain.

9. District and Divisional Officers are specially directed to watch the effect of this concession, and to state the results in their fortnightly narratives.

Evidence in regard to insufficiency of the reduced wages.

628. In regard to the evidence bearing upon the insufficiency of the wage-rate introduced by Sir Richard Temple, there has, I believe, never been any doubt on the part of Relief Officers connected with famine in Madras. In Bombay, owing to the fact that nine-tenths of the famine laborers were employed under the organization of the Public Works Department on the higher scale of pay, the question of the sufficiency of the lower scale was never practically tested, and the evidence in favor of it is merely of the kind described by Sir R. Christison as the "loose observation" of practical men. The Bombay officers who have reported in favor of it, are silent in regard to the death-rate amongst this class of people, and there is nothing to show that they appealed to the only true method of ascertaining its effects, *viz.*, the weight test.

629. On the other hand, the evidence in Madras, both of practical and scientific observers is, in my opinion, conclusive on the point, and it is important that some of this evidence should be here collated.

Mr. Grose, Collector of Nellore, writes on 17th April 1877:—

"The Zillah Surgeon has weighed the same coolies (selected under my orders as fair specimens) week after week, beginning on the 15th March, and I have made it a point to be present as often as possible. The coolies looked very thin and hungry at the first weighment (They were all then much below their normal weight.—W.R.C.), and they looked just as bad, but not worse on the last occasion at which I was present, the 7th instant. The men had then lost 1·7 per cent. of weight, and the girls 2·6, but the weight of the women was stationary, and the boys had gained in weight. From the results of the last weighing on the 14th instant, I see all classes have now lost weight, girls as much as 4·8 per cent."

630. Now, if Mr. Grose had been content merely with looking at the people, he would have reported that no perceptible change had occurred, but with the steady decrease in weight of the coolies within one month, the evidence is quite clear as to the insufficiency of the diet to maintain their condition.

631. On the 18th April Surgeon-Major Æ. M. Ross, Civil Surgeon of Nellore, an officer to whom I am very greatly indebted for his labors in weighing and examining the people, with the view of obtaining exact evidence on the subject of the sufficiency or otherwise of the food ration, thus reports:—

"There is no doubt that the laboring classes, as a rule, have fallen off greatly in condition within the last few months, and it must be remembered that we see none of the worst cases of destitution in the streets. All such cases are at once sent either to hospital or to the relief-camps by Inspectors, who patrol the town for the purpose; but after all this weeding out, I can say most decidedly that the people I meet now in the streets are thinner and poorer looking every way than those I saw six months ago, when even the poorest mingled in the streets.

"There are thousands of starving and dying people in the relief-camps and hospitals. We shall probably never know how many have died in the jungles and by the road-sides. I have upwards of 300 now in hospital suffering from famine diseases."

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632. From Coimbatore J. H. Cook, Esq., reports from the Oodamalcottah Taluq on 14th March :—

"I would point out that the condition of the coolies is not as I should wish. They are certainly deteriorated owing to the small pittance we pay them, and say they are unable to do the same quantity of work they were doing before. If we want to keep up the physique of the coolies, and help them to ward off cholera in these famine days, it is necessary to pay them higher wages."

633. On the 20th April Mr. J. D. B. Gribble, C.S., writing from the sub-division of Cuddapah, reports 20 per cent. of the laborers as "badly reduced" in condition, and 14 per cent. "weak."

634. Mr. Oldham, B.C.S., in charge of famine relief in the Adoni Taluq of the Bellary District, was obliged to raise the rate of wages in the end of March on account of the falling off in health and strength of the people.

635. Mr. Glenny, the Sub-Collector of Bellary, reported to the Collector (3rd May) that the people "are decidedly thinner than they were."

636. The Deputy Collector of Harpanhully Division reported "that the coolies have become weak on account of reduced wages, and that they are not able to work as before."

637. Deputy Collector Raghava Row writes:—"The coolies, principally males, are far behind their ordinary health and strength. They are failing in both, apparently from inadequate food and defective nourishment." (This was in the Hadgally Taluq).

638. The following report of Mr. Macartney, the Agent of the Sundoor State, is especially valuable, as the opinion of one whose life has been spent among the people, and who has great practical experience of the habits and customs of Natives. It will be observed that this gentleman gives no countenance to the suggestion that a pound of grain was more than the average quantity consumed by a laborer in ordinary times :—

To J. H. MASTER, Esq., Collector of Bellary, dated Beederhally, 20th March 1877, *No.* 30.

With reference to G.O., No. 757, dated 1st instant, copy of which was forwarded to me with your endorsement of the 8th idem, I have the honor to inform you that my attention has been directed, both last week and this, to the points indicated therein, and that I have now no hesitation in expressing my conviction that the reduced scale of wages is slowly but surely deteriorating the power and physical condition generally of many of the laborers under my charge.

2. The late somewhat fatal outbreak of sickness, attributed to Asiatic cholera, and so registered, I am strongly inclined to think was not wholly nor even mainly such, and that the following causes are sufficient to account for most of the cases and the symptoms observed, to wit, general debility, enfeebled digestive powers, incapable of assimilating food, the drinking profusely of water after eating in order to give a feeling of satiety, and exposure under such conditions to chills during the night. Sickness has largely diminished since the nights have become higher in temperature. What rather confirms me in the above view of the case is the fact that though several, who subsequently died, were carried to their respective villages, yet there was no spread of illness there, as usually happens when cholera is introduced. This sickness was almost, if not wholly, confined to the laborers on the relief-works. Of course I may be mistaken in the inference which I have drawn, but I feel it to be my duty to express exactly what I think, so long as I am conscious that my opinions are not negligently formed.

3. I do not believe that one pound of inferior grain is sufficient to preserve a working man in vigor, nor that it amounts to anything like what he consumes daily in ordinary times. I know that it is quite common in this part of the country for a strong healthy man in full work to eat within 24 hours one full seer of cholum, and in not a few instances even a Rajah's seer, which is equal to one and a quarter of the Bellary measure, and that, too, of much better quality than can be now procured. Nor need this be wondered at on the ground of cost, when it is remembered that in average years grain is 300 per cent. cheaper, and wages exactly a half more than at present. The wages under the old scale during the whole of December last were only a fraction over those of the existing one, when the then ruling prices of grain in Sundoor are considered (I mean the general wage, not that of skilled labor, which was considerably more).

639. On the 21st May Surgeon-Major Æ. M. Ross of Nellore records in his weekly weighments :—

"Comparative weight is an approximate, but by no means an accurate measure of loss or gain of muscular substance. No. 4 on the list, for instance, Polwoo, a muscular-looking man

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of 30 years of age, has only lost 2 lb. since first examined, but his muscles instead of being "hard as nails" as when first examined, are now quite soft to the feel, and he himself states that he feels a loss of muscular power, and disinclination for exertion."

"I have noticed this falling off in several who have not lost weight perceptibly."

"Again, in the case of No. 17 on the list, a tall well-made young woman of 20 years of age, who has not lost more than ½ lb. weight since she was first examined, the breasts, which when last seen were well developed, have now almost totally disappeared."

Again, on the 12th June, Dr. Ross records of the coolies first examined by him:—

"One who had gained weight, No. 9, owed his increase in weight to increasing dropsical accumulation. He was visibly thinner otherwise than before."

In the same letter he notes—

"The deterioration in the condition of the coolies is most marked. It will be more so, if the wretched condition in which they were when first examined is borne in mind. A glance at the tables of weights taken at different periods will show a serious falling off in the condition of the coolies examined, many of them young, or in an age of active growth; while if their diet during the period they were under examination had been sufficient, almost all should have increased in weight."

On this report the Surgeon-General makes the following marginal comment:—

"The coolies employed on the relief-works are practically illustrating in their poor bodies the gradual process of dying under a starvation diet;"

and the Deputy Surgeon-General of the division, in forwarding the report, remarks:—

"This is positive proof of the apprehended inadequacy of the one-pound ration."

640. In Chingleput, the Special Relief Officer, Major Murray, a gentleman who took the greatest interest in his work and spared himself no trouble in the cause of humanity, on the 5th May recorded:—

"The people who came under my notice as relief laborers in this district on the reduced scale of wage are still falling off, and it will be unnecessary that I should furnish any further weekly report on this subject, as I am fully convinced—and no further experience can alter this conviction—that the reduced scale of wage is insufficient to provide the laborer with the necessary food to keep up his physical condition, and at the same time do any work."

The officer in charge of the Trivellore Taluq reported on the same date:—

"There has been a slight deterioration in the physical condition of the coolies, owing to the insufficiency of the scale of wages, but partly to the excessive heat of the weather."

641. On the 14th May the Civil Surgeon of Chittoor reported—

"On the 11th instant and 13th, I inspected about 2,000 coolies; of these I specially examined 700 one by one. This body of 700 people comprised 350 men, 260 women, and 90 children. Of the men I consider 30 per cent. to be anæmic, of the women 24 per cent., and of the children 20 per cent. Many of those who were anæmic do not appear to have lost flesh, though their health has undoubtedly deteriorated, and daily numbers present themselves at the hospital suffering from dropsy, unable to continue longer on the works from this cause. Many also (about 100 I am informed) have been unable during the last two weeks to complete their task-work on account of weakness; they have been fined one or two pies in consequence, which further reduced their ration. * * * *

"I enclose list of weights of seven gangs of coolies. From the aggregate of these lists, it may be seen that during the week from May 4th to May 11th, 39 coolies decreased in weight 46¼ lb., and 17 coolies increased 18 lb., showing a decrease of 28¼ lb. in 56 coolies in a week, and that during the fortnight from April 27th to May 11th 35 coolies decreased in weight 68½ lb., and 13 coolies increased 19½ lb., showing a decrease of 49 lb., in 48 coolies in a fortnight."

Again on the 8th June, or a fortnight after the higher scale of wages had been brought into force, Dr. Walker was not able to report any improvement. The mischief of the low wage, in fact, had already been done.

* * * *

"2. On the 15th instant I inspected about 3,126 coolies; nearly all were capable of doing the work now required of them; a few whom I considered incapable of labor were, at my suggestion, admitted into the relief-camp.

"3. The increased scale of wages has been in operation for a fortnight in this taluq, but the time has not been sufficient to produce any marked improvement in the physical condition of

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the laborers, whose assimilating powers are not capable of deriving immediate benefit from the more liberal diet which it is now in their power to procure; many are still very anæmic, and this deteriorated state of blood is a condition not capable of immediate improvement, even under a better scale of diet, but will remain for a considerable time, perhaps several months, and in some cases may never be got rid of.

"4. I enclose weight lists of eight gangs of coolies. Amongst those laborers who have remained in the gangs since my last report (28th May), 53 in number, 16 have increased lb. 33½, but a larger number, *viz.*, 37, have decreased lb. 65½, showing in the aggregate a decrease amongst 53 laborers of lb. 32.

"5. Numbers have again, during the past fortnight, left the works, some to endeavor to cultivate their fields, whilst a few, being unfit for labor by reason of weakness or disease, were received into the relief-camp or hospital. The relief-camp on the evening of 16th instant contained 733 individuals."

642. One of the most able and zealous Collectors of the Presidency, a gentleman who devoted himself heart and soul to the relief of his people, and who spent the whole of the hot season in moving about to see famine affairs with his own eyes, *viz.*, Mr. Price of Cuddapah, has thus recorded his impressions of the people in the end of April:—

From J. F. PRICE, Esq., Acting Collector of Cuddapah, to H. E. STOKES, Esq., Secretary to the Board of Revenue, dated Nundialampett, 26th April 1877, *Extra No.* 962.

Referring to G.O., No. 1,148, dated 19th ultimo, communicated in the Proceedings of the Board of Revenue, No. 4,357, dated 23rd idem, I have the honor to enclose a statement showing the results of an examination of 5,599 coolies made by me in the Budwail Taluq.

2. If details of each gang are required, I can furnish a copy of my register. I do not send this as it will take some time to write out, and I presume that the Board will not care to have such very full particulars.

3. I ranked up every party, went along it (in almost every case with Mr. Cox or Mr. Horden) and picked out every man, woman, or child in good, indifferent, bad, or very bad condition. The remainder were put down as fair.

4. I took as my standard of "good" those who bore no signs of emaciation, whose limbs were strong and firm and who were evidently capable of doing a good day's work. The "fair" were those whose physique was such that they could be made to do the task assigned without danger to themselves, but who were, at the same time, not fit for a day's work in the ordinary acceptation of the term. A large proportion of these consisted of persons who, if properly fed for a week or two, would pass into the class "good," but who, if they still continued to receive their present rate of wages, would, in my opinion, and, in about the same, or a little greater lapse of time, descend to the class "indifferent." The "indifferent" were those who were unfit for the performance of the present task, the "bad" those who could do only the veriest pretence of work, and the "very bad" those who had to be sent to the relief-camps.

5. The results show that the larger portion of the coolies was either in fair or indifferent order—that is, in plain words, that the main body, which consisted of people in the flower of their age, was in a state which could not be justly termed good, and that a considerable contingent, which comprised, for the greater part, middle-aged and old persons, growing lads and budding women were in a still worse condition.

6. I put the difference of condition between the people at Budwail and Porumamilla down to the fact that rice only is procurable at the latter place, there being exceedingly little dry grain left in that part of the country, excepting what is retained by the ryots themselves for their own consumption or for seed, and that at Budwail ragi is still to be had at a rate slightly more favorable than rice. The Porumamilla parties were certainly one step, if not two, below those at Budwail, and, had it not been for a considerable weeding into the relief-camp some few days prior to my visit, the proportion of "very bad" would have been very much higher than it was.

7. The gangs which I inspected at Razupalayam were what was left of a party of some 1,100 after those capable, or supposed to be capable, of going to Nellore, had been turned off. It was evident, however, that the Superintendent, a native, had exceeded his orders, and instructions were issued to take on again some of those who had been excluded.

8. I made inquiries and questioned many of the people, but I saw and heard of no case of their eating leaves, and every one said that he or she had been properly paid. I do not think that famine coolies in these parts, though they may give the head cooly or maistry the customary "dustoori" in order to have their names entered upon the rolls, allow themselves to be defrauded of their wages. They are open-mouthed enough in their complaints, but I have found that when anything was said against the head coolies or maistries it was generally either that they worked the people up to their allotted tasks, struck individuals off the roll for being constantly absent, or else refused to enter children in a class higher than they should be. Mr. Cox, who understands and speaks Telugu remarkably well, and who is very ready to hear and patient in investigating every complaint, no matter how petty, has not been able to find any cases of the

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coolies having been paid less than was due to them. I have not the slightest moral doubt, nor has he, that Government has been considerably defrauded as regards the number of children receiving 3 pies per diem. Some cases of this brought forward by the Assistant Famine Officer Mr. Horden, are now under investigation, but I fear, from what I saw, that nothing can be made of them from a magisterial point of view.

9. Having read, with much interest, the remarks made by Dr. Cornish in the various reports submitted by him to Government, I have been much struck with their correctness. The famine is evidently telling and telling heavily upon the old and very young. The former are, with very rare exceptions, becoming shrivelled, flabby, and haggard in appearance, and the girls and boys, who have arrived at the point of puberty, show, in their faces and limbs, all the signs of insufficient feeding. They are "spindly," their arms are thin and flabby, their legs are wanting in flesh; the knee joints, in the case of the boys, and of such girls who having tucked their cloths up to work, allowed of my seeing their knees, stand out like knobs, and the insides of the thighs are flattened and loose. The busts of the girls have not filled out, and the chests of the boys show the bones, and they mostly tie themselves tightly round the waist, producing an unnatural and puffy appearance of the abdomen. Their skins, instead of being of a healthy smooth brown, have a nasty yellowish cast, and are frequently dull in color. The infant population, *i.e.*, the sucking children, are very much reduced, in some cases almost skeletons; their arms are like sticks, their ribs show distinctly, and their buttocks are perfectly flat; their legs are like their arms. At Porumamilla, the larger part of the children in arms were in this state or verging upon it. The payment of 3 pies for these can do no good. This sum will not provide the mother with a sufficiently increased supply of food to find milk for her little one. The nursing women must either have a special and considerably increased allowance, or the infants must die. This is a point upon which I have not the slightest doubt. I have questioned several women as to the reason of their children being in the state that I have described, and the answer has invariably been "I have little or nothing for it." The truth of this was apparent enough.

10. The Board know that I am not a sensational writer. I am simply stating facts, and the correctness of these can be proved if Government will send the inspecting medical officer just appointed to this district to visit the northern portion of the Budwail Taluq.

11. I have sent many women with terribly emaciated children to the relief-camp, and have left my Dresser there with instructions to order conjee and whatever extra food he may consider necessary for all reduced cases; but, if every woman who is nursing is to be sent into the camp, I shall have to extend it very much, and I think it better and cheaper to give them a special allowance.

12. I cannot blame Mr. Cox or those under him for the condition of the infant population. He has worked conscientiously and unremittingly in the execution of the duties confided to him. He has obeyed the instructions given him, and has seen that the people have been regularly paid the wages and allowances ordered by Government. Money payments will not make up to infants the absence of what is their natural support, and the only course which I see open, if they are to be saved, is to give the mothers the means of obtaining more to eat than they are at present getting. Three pies is not enough for this. I would strongly recommend that every nursing woman should receive 2 Annas a day. They can easily enough be marked, and there can be little, if any, cheating in this matter.

13. I am sorry that I did not, until it was too late, think of making a note of the number of pregnant women seen by me amongst the 2,700 which I inspected. I however had Dr. Cornish's remark on this point in my mind when looking them over, and noticed that the number in this condition was remarkably small.

Statement showing the Number and Condition of Relief Coolies in the Budwail Taluq examined by the Acting Collector of Cuddapah during the Month of April 1877.

Station.	Number of Coolies examined.			In Good Condition.			Percentage.			In Fair Condition.			Percentage.		
	Men.	Women.	Children.	Men.	Women.	Children.	Men.	Women.	Children.	Men.	Women.	Children.	Men.	Women.	Children.
	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.
Budwail	798	1,094	334	196	207	46	25	19	13	449	746	193	56	67	58
Porumamilla ...	1,170	1,415	388	147	67	37	12	5	11	783	1,006	146	67	71	43
Razupalayam ...	87	201	61	...	1	10	...	1	17	40	109	16	46	54	26
Total ...	2,055	2,710	783	343	275	93	17	10	13	1,272	1,861	355	62	69	48

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Statement showing the Number and Condition of Relief Coolies in the Budwail Taluq examined by the Acting Collector of Cuddapah during the Month of April 1877—(Continued).

Station.	In Indifferent Condition.			Percentage.			In Bad Condition.			Percentage.			In very Bad Condition.			Percentage.		
	Men.	Women.	Children.	Men.	Women.	Children.	Men.	Women.	Children.	Men.	Women.	Children.	Men.	Women.	Children.	Men.	Women.	Children.
	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.
Budwail	124	118	84	16	11	25	20	17	10	2	2	3	9	4	2	1	1	1
Porumamilla	207	305	122	18	22	36	23	33	24	2	2	7	10	4	9	1	...	3
Razupalayam	43	75	24	49	37	39	3	4	10	4	7	16	1	2	1	1	1	2
Total ...	374	498	230	18	18	31	46	64	44	2	2	6	20	10	12	1	1	2

(Signed) J. F. PRICE,
Acting Collector.

Submitted to Government.

* There are discrepancies, amounting to 11, between the details and the totals of his statement which are here corrected.

2. Mr. Price's examination embraced 5,487 * coolies, *viz.*, 2,055 men, 2,698 women, and 734 children, and the percentages he arrived at are as follow :—

—	Men.	Women.	Children.	Total.
Condition good	17	10	13	13
Do. fair	62	69	48	63
Do. indifferent ...	18	18	31	20
Do. bad	2	2	6	3
Do. very bad ...	1	1	2	1
Total ...	100	100	100	100

He describes his standards in paragraph 4 of his letter. The gangs, it is to be observed, were weeded of the worst cases for the relief-camps a few days before his inspection.

3. The report deserves close attention. Mr. Price is a careful observer and competent to form an opinion, and there can be little doubt as to the accuracy of his description. The able-bodied men are at present just kept going, but their condition is below par; the old men and growing children are very low; and nursing mothers are unable to nourish their infants. The numbers on gratuitous relief are increasing, and unless some increase of wage is allowed many on the works must succumb.

4. There is no reason to suspect fraud upon the laborers, and their low condition cannot be accounted for in this way. Mr. Arbuthnott, in passing through the locality some months ago, found the people much reduced and distress severe, and they have not been able to regain their strength on the relief wages. The reduced wages have told more upon the people at Porumamilla than at Budwail, because, as pointed out by Mr. Price, rice is alone procurable. The fact is that the new scale has there been fairly tried; whereas in most other places where it is in force a cheaper grain than that on the price of which the scale is fixed has been available. The Board are of opinion that some addition to the wages should be conceded to the classes who seem to suffer most at present, *viz.*, the old persons, the growing children, and the nursing mothers.

5. More camps should at any rate be opened on the separate hutting and money-payment system, with free permission to the occupants to come and go at pleasure (G.O., No. 1,510, dated 21st April 1877), and nursing mothers might be sent to these camps and not required

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to work. Mr. Price's relief-camps seem to be too elaborately organised, and experience elsewhere has shown that such camps do not succeed.

(Signed) H. E. STOKES,
Secretary.

643. Assertions have been made* that the class of people on relief-works never went into the camps provided for the weak and helpless, but the following account from Mr. J. D. Gribble, C.S., the Sub-Collector of Cuddapah, is sufficient to prove that those who got worn out on the works on relief wages did go to camps. The fact is sufficiently established also by the evidence of Dr. Walker of Chittoor, in letter of 14th May, No. 1,150, and by the experience of every officer engaged in famine relief.

Transfer of laborers from works to relief-houses.

"I beg also to state that I have had a correct census of the inmates of the Madanapully camp taken, and the Superintendent reports that out of 1,458 inmates 428 have been coolies on different works. This shows that the paupers in the camp are not drawn only from the professional beggar class, but that one out of 3½ in the Madanapully Camp has been a cooly on relief work. This is, I think, conclusive that the present rate is not sufficient."

644. The Board of Revenue state as follows :—

2. The Collector of Bellary reports that the wages in the Adoni Taluk (except Adoni Town) have been raised to 2 Annas, 1½ Annas, and 1 Anna to men, women, and children, respectively; and in Alur, Gooty, Tadpatri by 3 Pies to all laboring coolies. The rates already in force, according to the reports for the 28th April, are 1 Anna 6 Pies, 1 Anna 3 Pies, and 9 Pies, corresponding to grain at 7½ seers. The prices now ruling in these taluks may be ascertained from the price lists sent to Government with the relief reports for the above date.

3. The Board have just submitted to Government a report from Mr. Price, showing that the coolies in the Budwail Taluk were suffering under the reduced wages, and the same result has been reported from the Cuddapah Sub-division and from the western taluks of the Bellary District. A strong concurrence of testimony showing that the rates are quite insufficient is now accumulating, and the Board cannot but think that there is very serious risk in continuing the lower rates now in force. They seem to have failed wherever they have been fairly tried; for in many places where the new scale is said to have produced no ill-effects, either the coolies have had the advantage of being able to purchase a cheaper grain than that taken as the standard, or they have been able to earn wages for the higher scale of task-work.

4. The lower rates are probably now beginning to tell with severity on weakened frames exposed to great heat without any, or with very inadequate, shelter. A continuance of the present experiment may lead to great disaster. * * *

(Signed) H. E. STOKES,
Secretary.

645. The following extracts are from reports of Native Revenue officials in the Bellary District :—

From V. VENKATACHELLUM, Deputy Collector, to J. H. MASTER, Esq., Collector of Bellary, dated Hospett, 17th April 1877, *No.* 217-*F.*

With reference to paragraph 6 of the Proceedings of Government, dated 31st January last, No. 329, reducing the wages of the coolies employed on relief-works and requiring a report of the result of wages, I beg to submit my report on the bodily state of the coolies.

2. The rate * allowed by this order has been in force from March last in the three taluks (Harpunhully, Hadgally, and Hospett) of my division.

* For a man, the value of	1	pound of grain	+ ½	Anna.
For a woman	1	do.	+ ¼	"
For a boy or girl	½	do.	+ ⅛	"

3. Although it is a known fact to all natives that half seer of grain is hardly sufficient for a single meal to an able-bodied cooly, and that on average half seer will suffice to one meal to a man, still I waited for more than a month to report the result of the reduction of wages, together with the opinions of all the officers in my division.

4. The Temporary Deputy Collector C. Raghava Row who inspected the coolies working in Harpunhully and Hadgally Taluks reports that they (coolies) are failing in health and falling off in strength, and that many who were working with pick-axes a few weeks ago are now

* "I have to explain that there is no connection whatever between recipients of gratuitous relief on the one hand and the recipients of relief wages on the other. The inmates of these camps who are admitted there as being unable to work, are a class totally different from those who are admitted to the relief-works as being able to work. Inferences deduced from the condition of the recipients of gratuitous relief are wholly irrelevant if attempted to be applied to the condition of relief laborers."—*Sir R. Temple's Minute, 18th April, paragraph* 6.

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unable to use them, and that he has seen some, between thirty and thirty-five, so feeble as to require a support to walk, and that he learnt that they were a few days back in good health and were working on relief-works.

5. The Temporary Deputy Collector Narasimha Charry states that with few exceptions the parents of many a young child look very much depressed in their condition, and the children also bear an equally distressed feature, and that it is too late for them to regain their power after the system has become accustomed to half-starvation.

6. The Tahsildar of Hospett reports that the coolies are suffering from reduction of wages and by hot weather, and that the coolies above 40 years have become lean and unable to work as before.

7. The Tahsildar of Hadgally reports that the wages now paid are not sufficient for two meals a day, and that work cannot properly be done by the coolies as before.

8. One half seer was suggested as it might be sufficient to sustain life. It may be sufficient to prevent death if the man that receives it sits quietly in his house; but it is quite different when he is required to render task-work in the hot weather.

Supplement to the *India Gasette*, 24th February 1877, page 300: Memorandum respecting the Kolar District of Mysore.

Gratuitous relief is being given at the Government expense at ten places. Cooked food, one meal of (half a seer) raggy with a spoonful of pulse soup, is given to all but high caste recipients, who are allowed to take away uncooked food.

9. That half a seer is sufficient for *one meal only* is apparent from the fact that the cooked food of (half a seer) raggy which is being given in Kolar is referred to as given for one meal. It was admitted that the relief operations were going on in Kolar economically.

Vide report of the Revenue Inspector B. Beema Rao.

10. As the coolies are being required to render task-work, and as the wages they get are not sufficient to satisfy their appetite, some coolies make conjee-water from cholum and mix bran in it and eat it. By this unwholesome food and by working in the sun, ninety-two deaths occurred in the coolies who have been working on Kamalapore road after the introduction of the new scale.

11. I have inspected 2,500 coolies on 11th instant who were working on the Dharwar road. I did not find them to be strong, but one-fifth of them are in a very weak state. The cause of the four-fifths not being in an emaciated state is that they are inhabitants of the villages on river channels, where they had saved something to supplement their present wages.

12. Some elder coolies, saying that they have no bellyful meals, have shown their bellies to me, which appeared like pits. They appear like persons who have no food for some days. I fear that if they have to live on this half-seer rate for a few days more they will be liable to some serious sickness.

13. The Revenue Inspector who is superintending the work reported to me that several weak coolies, not being able to work, left it and depended on the poor-house for living.

కడుపునిండా అన్నంతినడముకు ఖైదుచేసినంతపుణ్యంనే
ను చేసుకోలేదా.

14. All coolies, men, women, and children, represented to me that the wages are insufficient. One of the elder coolies asked me "have I not the virtue of a convict to get bellyful of food;" another answered him that "we can also get bellyful food if we commit theft."

15. The coolies are now convinced that the convicts get higher rate of wages, and this is the cause for the increase of offences and overcrowding of sub-jails and district jails.

16. As some of the persons who formerly lived by cooly work left it by weakness caused by reduction of wages, the number of applicants in poor-houses is on the increase. Of the exhausted persons that receive cooked food some are dying after few days, as their hopes of recovery were gone already.

17. The increase of expenses in feeding the prisoners and the batta expenses paid to the witnesses in criminal cases and other expenses (Police, &c.) have to be considered at the time of the saving effected by the reduction of wages.

18. I submit that ¾ seer or 1½ pounds of grain and ½ Anna for an adult cooly (man or woman), ¾ pound of grain and 4 Pies to a boy or girl, is the lowest rate that may be paid. If 3 Pies are paid there will be 1 Pie for chillies, salt, tamarind, &c., after deducting 2 Pies for firewood.

19. The report of the Harpunhully Tahsildar has not been received as yet.

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From C. RAGHAVA ROW, Special Deputy Collector, to the Deputy Collector of Bellary, dated Tumberhully, 5th April 1877, No. 67.

I have the honor to report the results of my inspection of the gangs employed on the relief-works in Harpunhully and Hadgally Taluks.

2. Judging from the present physical condition of the laborers generally, I think that they are failing in health and falling off in strength. Many who were working with pick-axes a a few weeks ago are now unable to use them, and they complain of debility, which their reduced and decaying forms and hungry appearance clearly indicate. I have seen some, between thirty and thirty-five, so feeble as to require a support to walk, and I learnt that they were a few days back in good health, and were working on relief-works for wages, but are now succumbing to inadequate food and defective nourishment.

3. Every laborer honestly complains of low wages, and earnestly solicits an increase; and their cry that they are ill-fed and are starving, and becoming feeble day by day is loud and general in every gang that I have seen. From careful observation and frequent and varied tests I am convinced that the mere individual subsistence allowance that we now give them as wages is barely sufficient for a single meal in these hard hot days when they have to work under the burning sun.

4. In relief-camps a pound of flour to an adult, and half a pound to a child were originally allowed, and food was cooked and distributed accordingly. But this was found to be very insufficient to feed the recipients even for one meal, and it is now raised under the Collector's recent orders so as to suffice for two meals. As laboring coolies get less than these persons at rest, I strongly and respectfully advocate for an increase to the present reduced wages. I think it is now time, if not late, for Government to revise the rates to maintain ordinary health and strength of these distressed laborers and to prevent utter prostration, which must eventually and inevitably result from further continuance of this sort of slow starvation.

5. A distinction is shown in the rates of wages for males and females. In theory as in practice females generally, and laborers particularly, eat more than males and require better nourishment, and when both the sexes have to earn their food by daily physical exertion, and when we give them nothing more than what is required strictly for their individual subsistence, I do not see why their food should be reduced.

6. Employing weak and ill-fed persons on light work does not appease their hunger or supply food and nourishment which they require, though it may prevent exhaustion and give them rest and ease from toil. But any little work to a hungry person is a hardship, and if he be allowed to drag on by slow feeding, he must in a short time become feeble and feeble till unfit for any work.

7. I think that 2 pounds of grain and ½ Anna to an adult of either sex, and 1 pound of grain and ¼ of an Anna to a working child below 12 if a female, and 15 if a male, should be allowed to keep them in health and strength for their present relief work and future agricultural labor.

8. The children of laborers below seven years now get ¼ of an Anna each for its support, and as this does not give it a handful of grain or add to the mother's nourishment, I think that the allowance may be increased to ½ an Anna.

From B. NARASIMHA CHARRY, Special Deputy Collector, to the Deputy Collector of Bellary, dated Hospett, 8th April 1877, No. 2.

Referring to the orders of Government, dated 1st March last, endorsed on the report of the Sanitary Commissioner of Madras, I have the honor to report the result of my inspection of the coolies employed on many of the famine works in the Hospett Taluk.

2. Having very recently joined my appointment in this part of the district, I am not exactly in a position to express my opinion from personal knowledge as to whether or not there has been any perceptible loss of power or flesh among the coolies since the introduction of the reduced rates of wages, which appear to have been brought to force from the early part of March last. With the exception of elderly men and women and the parents of many young children who are not fit for work, the general condition of the coolies appeared somewhat declining, commensurate with the insufficient subsistence allowed to them and the disadvantages of the present weather. Exposed as they are to the scorching sun throughout the day, with no shelter to retire to even during the short recess allowed at the hottest part of the day, and fed as they are half bellyful, I am of opinion that the coolies providentially preserve health in their weak condition, and no sickness is prevalent among them to any imaginable extent.

With few exceptions the parents of many a young child look very much depressed in their condition, and the children also bear an equally distressed feature. The reduced condition of elderly men and women is no doubt the natural consequence of age, coupled with insuffi-

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cient nourishment, and I am afraid that it is too late for them to regain their power, as any increased rations after the system has become accustomed to half-starvation would do more harm than good. From my own experience of the effects of total periodical starvation and continued single meal, I beg to submit that starvation for a day or two impairs the system to such an extent as to render it unfit to digest the usual quantity and quality of food for two or three days, while continued single meal for a few months not only reduces the strength of the body, but also takes a long time to befit the system for digesting two meals. The rates hitherto allowed were only sufficient for a full single meal, and with regard to parents of several young children who were getting nothing before, the effects of these rates was mischievous, though gradual. Although men and women of the laboring class were in the habit of eating three times a day, yet their present enfeebled system would be overburdened if a sudden increase of food and nourishment is given to them. I would therefore beg to suggest that for the present the money commutation of the subsistence of the coolies be fixed as follows:—

$1\frac{1}{2}$ lb. of grain and $\frac{1}{2}$ Anna to an adult cooly of either sex.
$\frac{3}{4}$ lb. of grain and $\frac{1}{4}$ Anna to a working child between eight and fourteen.
$\frac{1}{2}$ Anna to non-working children who eat rice.
$\frac{1}{4}$ Anna to suckling children.

Of course the money payment made for the suckling children would add to the nourishment of their mothers, who require greater attention. As these rates are not fixed in proportion to their labor, and as the females generally eat more than males, I propose a uniform rate for both sexes.

3. I take this opportunity of suggesting for your favorable consideration the expediency of erecting temporary pandals for the use of non-working children, at least when the parents are at work in the scorching sun.

We should have one for every mile on the roads with the dimensions of about 16 × 4 yards, and they might be moved on along with the gangs. For other detached works one pandal of the above size will do, and each is estimated to cost Rupees 15, and the materials might eventually be sold when no longer required. I think that twenty such pandals would be required for the Hospett Taluk.

From N. MURUGESEM MOODELLIAR, Deputy Collector, to J. H. MASTER, Esq., Collector of Bellary, dated Kottoor, 18th April 1877, *No.* 250.

In continuation of my letter, No. 218, of the 8th instant, and with reference to your foot-note to G.O., No. 757, of the 1st March last, I have the honor to report, for your information, that since my arrival at Kottoor, Kudligi Taluk, I have almost every day watched the manner in which the large crowds of the relief laborers on the several works about this place are working. No less than 2,080 coolies have come under my observation, not mere inspection, and I must say that the result has not been encouraging.

2. The female coolies outnumber the male beyond all proportion, and the bulk of them are of low physique, many adults and broods of young children looking pale and lank. The grown up women, though of middle age, wend their way at work, and some of their infants strolling about the place, passing for miserable moving skeletons. The mothers complain that the $\frac{1}{4}$ Anna allowed to each of the children is not enough to buy sufficient nourishment for it, the pittance paid to themselves scarcely sufficing to buy them a good day's meal. Considering therefore the amount of exhaustion resulting from exposure to the burning sun of April and May, and the discouraging indications of the process of wastage among the relief laborers, I would respectfully suggest a gradual increase to the present rates of wages, until such time as we could detect a change for the better in their physique. In making this suggestion for your consideration I have not lost sight of the importance of the difference to the treasury that would result from having to "make the increase in the rates to over a lakh and a quarter of the laborers in my division," but I feel bound to do so at any risk in furtherance of the liberal policy of Government declared in the Government Order under reference.

3. The mere keeping of the body and soul together is not the mark expected to be reached, but the insurance of sufficient health and strength to enable our relief laborers to turn out a fair return of work is what is required, until the season turns favorable. But if the present indications of loss of energy among the coolies are suffered to gain ground, things might most possibly get from bad to worse.

(True Copies.)

(Signed) J. H. MASTER,
Collector.

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646. I have quoted these reports by Native gentlemen in the Revenue Department at length, because men of this class know, of their own practical experience, better than Europeans who are unfamiliar with the domestic life of the people, what is a sufficiency of food for the poor. There is no halting in their testimony. They saw with their own eyes, and graphically described what they saw, of the effects of an inadequate wage on the health and strength of the people. The practical experience of these officials was in exact accord with physiological induction.

The weight test of the sufficiency of food.

647. In my instructions to Sanitary Inspecting Officers I laid great stress on the importance of periodical weighment of gangs of coolies on relief-works, to ascertain how they kept in condition. But great difficulties occurred in carrying out these instructions. In some cases scales and weights could not be had. In others, ideas floated about amongst the people, that we wanted to weigh them to see if they were fit for forcible deportation, and in such cases the first weighing was generally the last also. The coolies experimented on decamped to other works. It was only at Nellore, Chittoor, Palaveram, and Poonamallee, that the weight test could be organised, and even in the two latter places, owing to changes occurring in the working gangs, the results, although showing marked indications of wasting of the people, were too meagre to be used as evidence. The Sanitary Inspectors were, as a rule, constantly on the move, and were thus unable to conduct periodical weighings, but at Nellore Dr. Ross, the Civil Surgeon, in conjunction with Dr. Sturmer, the Sanitary Officer, was able to submit a series of reports on the subject of the highest value, some of the results of which are summarised in my letter to Government, No. 683, of 15th June. In consideration of the value of precise records on this disputed, but really simple topic, I must quote the whole letter in this place:—

Government are aware that, owing to the constant shifting of coolies on relief-works, there has been very considerable difficulty in recording facts regarding their increase or decrease in weight while subjected to the reduced scale of wages.

2. I have now the honor to submit, for the information of His Grace in Council, the results of weighings made by Surgeon J. Sturmer, Sanitary Inspecting Officer of Nellore, which, I think, may be accepted in evidence that the wage was insufficient to maintain the people in health and strength.

3. The following are the particulars. On the 15th April Surgeon Sturmer weighed at Nellore thirty men, thirty women, seventeen boys, and fourteen girls. On the 29th April he brought six more men and four women under observation, as some of those originally weighed had disappeared. On the 27th May the numbers remaining were men seventeen, women twenty-one, boys ten, girls nine.

The original numbers and those present on the date of last weighing are shown below:—

	Original Number.	Present 27th May.
Men	36	17
Women	34	21
Boys	17	10
Girls	14	9

These results, as regards the steady continuance of the people on relief-works, are better than those obtained at Palaveram, where out of 100 individuals weighed only twenty-four could be found two months subsequently.

4. All these people at Nellore, who were present at labor, were weighed once a week.

5. Standards of weight were obtained by Surgeon-Major Æ. M. Ross, Civil Surgeon of Nellore, who carefully weighed and measured under-trial prisoners and juveniles in the Nellore Jail. There is only this objection to be made to the standards, that owing to the great food scarcity in the district the under-trial prisoners were thinner than usual, and therefore below their ordinary weight.

6. The standard ages, heights, and weights in the jail were as follows:—

Men.—Average age	... ...	32·5
Height ...	... ...	5′-2·71″
Weight, lb.	... ...	109·18
Women.—Average age	... ...	31·38
Height ...	... ...	4′-10·81″
Weight, lb.	... ...	92·81
Juveniles.—Age	... ...	13·66
Height ...	... ...	4′-7·44″
Weight, lb.	... ...	70

Averages obtained by Surgeon Sturmer at his first weighings of relief-coolies were as follows:—

Men.—Average age	... ...	28·4
Height ...	... ...	5·2′
Weight, lb.	... ...	89·8

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Women.—Average age	...	31·2
Height	...	4·10′
Weight, lb.	...	79·8

As the ages of the children on labor do not correspond with the jail standards, I have thought it better not to compare the results.

But with reference to men and women we see that under-trial prisoners in the district jail averaged in weight lb. 109·13 and 92·31 respectively, while those on relief-works were only 89·8 and 79·8 lb., that is, the people living quietly in jail for a short period weighed in the case of men 19·33 lb., and women 12·51 lb., more than the same class of persons outside the jail.

7. It will be evident from a comparison of weights that the people on relief-works had not much flesh to lose on the 15th April. A body of men averaging 5′ 2″ in height and 28 years of age, weighing only 6 stones 10 lb. each, must be considered as unusually spare of flesh, and the same may be said of a body of full-grown women, average 31 years of age, who weigh only 5 stones 10 lb. each.

8. But the most important results of all are those in reference to the growing children employed on labor. In their case, if food is sufficient, weight should perceptibly increase with age, but the experiment at Nellore shows a falling off.

We have now to see the results in regard to the people who appeared to be weighed again on the 27th May.

Of the seventeen men who came up for weighment on 27th May (the survivors of thirty-six)—

One remained of the same weight.
Seven gained weight.
Nine lost weight.

The seven men who gained weight accumulated on the whole 17½ lb. The nine who lost flesh weighed 28 lb. less than they did at the beginning.

The seventeen men, therefore, lost in the aggregate 10½ lb. in weight.

9. Of the twenty-one women—

Two kept exactly the same weight.
Six gained weight.
Thirteen lost weight.

The six women who gained weight were heavier by 12¼ lb. at the end of the month of May than they were five weeks before. The average gain per woman was 2 lb. and a little more than an ounce. The thirteen women who lost weight were 41 lb. lighter than at the beginning of the weighing. The average loss of each woman was 3 lb. 3 oz. The twenty-one women on the whole lost in weight between them 28½ lb.

10. *Girls.*—Of the fourteen girls originally weighed on 22nd of April, only nine appeared on the 27th May. Of these—

Two remained of the same weight.
Two gained weight.
Five lost weight.

Of the two who gained weight, the gain was 1¼ lb., and of the five who lost weight, the total loss was 7¼ lb. There was then a loss of 6 lb. amongst nine girls, or two-thirds of a pound for each.

11. *Boys.*—The number of boys originally weighed was seventeen. Of these ten were present at the last weighing on 27th May.

One was of the original weight.
Two had gained in weight.
Seven lost in weight.

The two who gained in weight put on 1½ lb. or ¾ lb. each. The seven who lost weight lost altogether 12¼ lb., and deducting the gain from the loss, there remains an average loss of 1 lb. per head of the growing boys (average weight at starting 42¼ lb).

12. From these weekly weighings of Surgeon Sturmer, then, it would appear that every class of the relief coolies have lost on the average in weight, while on relief works from 15th April to 27th May. That the people did not lose more is, I apprehend, to be explained by the fact of their extreme thinness when the weighings began; but when we find growing children, equally with adults, steadily losing weight, the indications of insufficiency of food are very certain.

13. I would beg to express my acknowledgments to Surgeon Sturmer* for the trouble he has taken to ensure weekly weighings and an accurate record of results. This record goes to corroborate Dr. vanSomeren's observations at the Poonamallee and Palaveram Camps, and especially as to the lowered standard of weights of the bulk of the people on relief-works. Dr. vanSomeren's reweighings did not yield trustworthy results on account of so few of the people being present at the second weighing.

* And also to Surgeon-Major Æ. M. Ross, Civil Surgeon, Nellore, who has given much time and attention to the weighing of selected individuals.—W.R.C.

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Weights of Relief Coolies, Nellore.

No.	April 22nd.	April 29th.	May 6th.	May 13th.	May 20th.	May 27th.	Increase or Decrease.	—
7	110	112	111	abs.	abs.	110	...	*Men.*
4	112	113	112	112½	110	109	— 3	The index numbers refer to the list first sent from Nellore; those whom I have not put down (there were originally 30) have not turned up since the first weighing, there only being 16 out of 30. I have added six more men.
6	81	abs.	abs.	abs.	abs.	77½	— 3½	The majority have lost weight.
10	74½	76½	79	72½	78	79½	+ 5	Age (YRS.) — Height (FT. IN.)
17	84	81½	78½	abs.	78	78	— 6	17 ... 5 3
18	79	80	80	82½	80½	81½	+ 2½	17 ... 4 11¾
20	76½	80	77	76	78	77	+ ½	30 ... 5 4½
21	81½	84	85	85	84	84	+ 2½	19 ... 5 2
24	76	78	76	77	77	76½	+ ½	17 ... 5 1
25	76½	76	abs.	78	74½	76	— ½	
26	102½	101	104	99	100	100½	— 2	
28	88	83	81	79½	82	80½	— 7½	
31	...	100	99½	101	99	99	— 1	
32	...	91	88½	91	89½	87	4	
34	...	95	92	94	95½	99½	+ 4½	
35	...	96	98	95	97	98	+ 2	
36	...	110	109½	110½	110	109½	— ½	
2	32	33	33	33	32½	32½	+ ½	*Boys.*
3	44	44	44	44	43	42½	— 1½	These young boys instead of gaining weight, show in nearly every case a steady decline.
4	32	abs.	31½	31	31½	30	— 2	
9	50	51	50	51½	51	49½	— ½	
10	50½	52	49	50	50	48	— 2½	
12	37½	37½	37	37	37	35	— 2½	
13	52	54	52	52½	54	53	+ 1	
14	44	46½	43½	44½	43	43	— 1	
15	51	50	51	51	51	51	...	
16	33	32	33	32	31½	30½	— 2½	
...	...	90·5	91·4	89·5	88·9	89·6	...	Average of Men.
...	42·6	40·0	42·4	42·6	42·4	41·5	...	Average of Boys.
3	96	96½	96½	96½	94½	96	...	*Women.*
6	90½	abs.	abs.	abs.	95½	93	+ 2½	
8	93½	90	91	93	94	96½	+ 3	Age (YRS.) — Height (FT. IN.)
10	82½	80½	81	81½	83	82	— ½	40 ... 4 7½
11	78½	80	80	82	80½	81	+ 2½	17 ... 5 0
12	88	88	89	99	87	88½	+ ½	35 ... 5 2
13	80	abs.	83	79	84	77½	— 2½	
15	85	85	84	86	83½	82	— 3	
16	88½	87	88	85	89	85	— 3½	
17	82½	85	84½	80½	82	79	— 3½	
18	80	79	78	79	75	77½	— 2½	
19	79½	78	80	83	80	78½	— 1	
20	71	72½	72	70½	71	68½	— 2½	
21	83	82	83½	81½	82	81½	— 1½	
26	84½	88	88	86½	87	86	+ 1½	
27	83	84	81	81½	83	80	— 3	
29	79	abs.	abs.	abs.	81	79	...	
30	85	85	84	85	85	82½	— 2½	
31	76½	79	79½	79½	78	79	+ 2½	
32	84½	85	82	82½	81	81½	— 3	
33	83	77	77½	81½	abs.	71	—12	
1	44	44	43	44½	43	42½	— 1½	*Girls.*
3	43	42	43	42	43½	41½	— 1½	
5	34	35	34½	34½	34	34	....	
7	37	35	35½	37½	36	36	— 1	
8	35	34½	35	35	34	35½	+ ½	
9	45	45½	45½	44	43	44	— 1	
12	55	56	58	57	54	52½	— 2½	
13	43	45	43	43	42½	43	....	
14	55	57	56	58	57	56	+ 1	
...	83·1	87·8	83·2	83·1	83·8	82·1	...	Average of Women.
...	43·4	43·8	43·3	43·9	43·0	42·8	...	Average of Girls.

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648. But Surgeon-Major Ross' register of weights includes observations for a long period. In one series his weighings are recorded for thirteen weeks, week by week.

Surgeon-Major Æ. M. Ross' experiments in weight test.

649. In these the average weight of 26 men on the first weighing, 15th March, was 92·1, and of 11 survivors on 10th June 92·4 lb. Here the apparent fractional gain in weight was due to dropsy supervening in two of the men. All the others had lost weight.

650. As regards women 30 in number, on 15th March their average weight was 76·2 lb., and on 10th June, of 23 survivors, the average weight was only 74·8.

Here again the gradual increment of disease led to fallacies in regard to weight. Thus, Fatima Bee, No. 6 in the list, who weighed 59 lb. on first examination, had gone up to 62½ lb. on the 13th week. It is recorded of her "Anæmic, feet œdematous." Of another who had increased from 74 to 80 lb., that she was "dropsical."

651. Of 11 boys weighed on 15th March, 7 remained on 10th June. The average weight of the 11 boys was 43·3, and of the 7 survivors, three months later, 42·6. Four of the boys had lost weight. Of 17 girls weighed on 15th March, 10 remained on 10th June. Of these all but two had lost weight.

652. In Dr. Ross' second series of weighings, the men weighed on 22nd April, 36 in number, averaged 89·7 lb. Of 17 survivors on 10th June the average weight was only 88·5.

653. Of 34 women the average weight on 22nd April was 83 lb., and of 23 of these weighed on 10th June the weight was 81·9 lb. Here, again, dropsy in several cases affected the normal weight.

654. The boys in the second series of weighings were 17 on 22nd April, and 11 on 10th June. They had decreased in average weight from 44·2 lb. to 42·1 lb.

655. Of girls, 14 weighed on 22nd April averaged 42·3 lb., and 9 survivors on 10th June averaged 43·5 lb. In this instance only was there an increase; and looking to the weekly register of weighments this appears to have been due to the improved wages after the end of May.

656. At a later date, on the 5th August, Surgeon-Major Ross describes the condition of these people after they had been for two months on the higher scale of wages. But meanwhile prices of ordinary food had increased relatively more than the wages, and the common food of the people, raggi, was difficult to procure at any price. Hence there was no perceptible improvement in the condition of the people even when the wage-rate had been restored.

From Surgeon-Major Æ. M. ROSS, Zillah Surgeon, Nellore, to Deputy Surgeon-General W. J. VANSOMEREN, M.D., Indian Medical Service, Presidency and Northern District, dated 3rd September 1877, No. 163.

I have the honor to report the result of my examination, on the 5th August, into the condition of the relief coolies in the neighborhood of Nellore.

2. The prices of the necessaries of life in the bazaar for the preceding week were—

	lb.	
Second-sort rice	9	per rupee.
Third-sort rice	11	" "
Jonnalu	13	" "
Raggi	14	" "
Horse-gram	20	" "
Green-gram	10	" "
Dhall	10	" "
Ghee	1	" 7 a.
Sugar	3	" rupee.
Jaggery	1	" 1 a. 4 p.
Mutton	8	" 1 a. 9 p.
Lamp-oil	1	" 4 a.
Gingelly-oil	1	" 4 a. 6 p.
Chillies	1	" 3 a. 4 p.
Black pepper	1	" 4 a. 6 p.
Tamarind	1	" 1 a.

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Men.—Eight were examined: one had gained 3½ lb.; six had lost weight—two 4 lb., one 2 lb., one 1½ lb., two ½ lb., total 12½ lb.; one remained stationary. Three were dropsical, one (who lost 4 lb.) less so than before, one was emaciated and dropsical, and one emaciated and scorbutic.

Women.—Eighteen were examined: nine had gained weight—one (who was very dropsical) 6½ lb., one 4½ lb., one 3 lb., two 2 lb., one 1½ lb., one 1 lb., two ½ lb., total 21½ lb.; five had lost weight—one 5 lb., one 3 lb., one 2 lb., and two 1 lb., total 12 lb.; four remained stationary. Four were anæmic and scorbutic, six anæmic and dropsical, two scorbutic and dropsical, one anæmic, scorbutic and dropsical, and one emaciated.

Boys.—Three were examined: one had gained ½ lb., one had lost 3 lb.; one remained stationary. One was dropsical and scorbutic, one anæmic and scorbutic.

Girls.—Eight were examined: four had gained weight—one 2 lb., one 1½ lb., two ½ lb., total 4½ lb.; four had lost weight—one 3 lb., one 1½ lb., one 1 lb., one ½ lb., total 6 lb. Three were anæmic and four were anæmic and scorbutic.

Coolies on Road-works.

Men.—Three were examined: all had lost weight—one 2 lb., one 1½ lb., one 1 lb., total 4½ lb. One was scorbutic and dropsical.

Women.—Twelve were examined: five had gained weight—three (one wore a heavier cloth) 2 lb., two 1½ lb., total 9 lb.; six had lost weight—two 4 lb., one 1½ lb., two 1 lb., one ½ lb., total 12 lb.; one remained stationary. Three were scorbutic, two anæmic and scorbutic, one scorbutic and dropsical, and one dropsical.

Boys.—Nine were examined: four had gained weight—two 1 lb., two ½ lb., total 3 lb.; five had lost weight—three 1 lb., two ½ lb., total 4 lb. Two were anæmic, two were anæmic and scorbutic, and one scorbutic.

Girls.—Eleven were examined: three had gained weight—one 2 lb., two 1 lb., total 4 lb.; eight lost weight—one 3½ lb., one 3 lb., one 2 lb., three 1 lb., two ½ lb., total 12½ lb. Five were anæmic, one scorbutic, and three anæmic and scorbutic.

Of the batch of coolies first examined, it will be seen that all but the women had lost weight. Although there seemed some improvement in the general condition of all classes, independent of gain or loss of flesh or weight, this, I fear, was more apparent than real, and was due, in part at least, to the elimination by death or disease of the worst conditioned among the coolies.

One of the women, I regret to say, Gainga Ademah, aged 50, 14th on the list, died during the week of sheer inanition while at work. She, with her daughter Jetty Soobbakka, No. 15 on the list, aged 35, had been marked emaciated at several previous examinations. She had often stated that she and her daugher were starving, and that the amount of rice they were able to purchase with the wages they received was insufficient to keep them in life. The Collector who was present at several examinations, and I myself frequently urged them to go into the relief-house, where they would get better and more abundant food without labor, for which they were unfit, but they both declared that they would rather die, and they have both done so; for, I hear that since the examination under report was made, the daughter also has died. It appears that the elder woman, three days before the date of the examination under report, while at work carrying earth, complained of feeling very faint, but continued to work for a short time more, when she fell down and in a short time died.

Of the second batch of coolies, all classes had fallen off in weight. Their general condition was not much changed from that noted in late reports.

They are gradually but surely deteriorating, so gradually that the various steps would, perhaps, not be noticeable to one who had not carefully watched them from the beginning and carefully recorded the results week by week.

A few more weeks of their present diet will render even the strongest among the men unfit for any moderately hard or continuous labor, while the weakest must die ere long. They are dying slowly now, day by day, week by week.

Jail experience in regard to dietaries.

657. It became evident at an early stage of the controversy regarding the amount of food necessary to keep a native of India in a working condition, that the vast experience of Indian jails alone could be referred to for a satisfactory solution of the question. The great majority of Indian jails have been under the supervision of trained Medical Officers, who have had not only the physiological questions, but the practical effects of certain dietaries, constantly before them. In Indian jails prisoners are weighed on admission and on discharge, and accurate records are kept regarding the condition of the people on admission and discharge. But the outcome of

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experience of Indian jailors in every part of the country has tended to suggest additions to the dietary, with the view of warding off those terrible results of chronic starvation, scurvy, dysentery and diarrhœa, which not so very many years ago made the jail mortality ten or twelve per cent., instead of two or three per cent. as it has since become. The general conclusions of the most experienced jail officers in regard to food, as recorded in the proceedings of the late Jail Conference, was that not less than 24 ounces of cereal grain and four ounces of pulse should constitute the staple food of a working prisoner, and that amongst races and tribes accustomed to animal food, discretion should be exercised in giving a portion of the albuminous nutriment in the form to which the people were accustomed. This experience of the Jail Conference accords entirely with my own. Any jail diet that does not contain from 200 to 230 grains of nitrogen in the daily food, does not, in my experience, tend to keep a laboring prisoner in health.

658. I pointed out at the time when it was determined to try Sir Richard Temple's experiment, that the rough and ready conditions of famine relief-works afforded no opportunities for precise and accurate observation, that experiments were not needed, because the jail records of India had shown, over and over again, the uselessness and cruelty of reducing rations below the jail standard, and that the question of the amount of food necessary for sustenance, and for laboring diets, had already been determined by an amount of precise and accurate evidence such as had never been brought to bear on the food question in any other country in the world.

Proposed experimental dietary in jails.

659. Surgeon-Major Æ. M. Ross of Nellore, in a letter dated 25th March, in pointing out the difficulties in conducting scientific investigations on relief laborers, suggested that if precise data as to the effects of the one pound ration *plus* six pies for condiments, &c., were required, that he would suggest the experiment being confined to certain selected men in the jail, and that he would be glad to conduct the experiment. On 1st May 1877, Government, in Order No. 1,610, sanctioned Dr. Ross' suggestion as a "temporary and experimental measure," but in no case was the trial to extend beyond one month.

660. But the Inspector-General of Jails protested against any such experiment being tried on prisoners, on the ground of the famine having already reduced the prisoners to such a low state of health that great mortality was occurring in spite of sufficient food, and the Government Order sanctioning the experiment was in consequence cancelled.

661. From a scientific point of view it is to be regretted that Dr. Ross was not permitted to conduct an experiment on prisoners. I venture to hope that permission may some day be given to have this question publicly tested, on a limited scale, on habitual criminals. I am quite satisfied that the results would justify my action in protesting against such a diet for famine-relief, but conclusive facts are apparently still needed to satisfy some authorities that human life and task-labor cannot be maintained on Sir Richard Temple's famine ration, and if an experiment is justifiable under such circumstances, it would be better that criminals should suffer, than the innocent and honest poor, whose only crime is poverty and helplessness in famine seasons.

Experimental trial of a reduced dietary in Bombay.

662. From a report published in the *Times of India* newspaper of 13th December 1877, I gather that the jail experiment which was not permitted to be tried in Madras was, under somewhat different conditions, enforced in one of the jails of the Bombay Presidency. No official account of this important experiment has been published.

663. Should the question require further elucidation at the hands of the Famine Commission, I have reason to suppose that the records of the Tanna Jail, if called for, may furnish the requisite details, and that the officer in charge of the jail, and civilians of the station who watched the experiment, could give positive evidence in regard to the sufficiency or otherwise of the diet scale. I submit that in the interests of science and the momentous question of feeding the poor in famine times, the full details of this experiment should be made known, and all evidence in regard to it sifted by the Famine Commission.

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664. Throughout the discussion in regard to the sufficiency of the famine wages experimentally introduced by Sir Richard Temple, I have had but one object in view, the most practicable means of saving human life. Scientific and practical experience in regard to food and dietaries of Indian populations, being almost wholly opposed to the policy endorsed by the Government of India for famine-relief, my official position as adviser of the Madras Government in public health questions left me no option but to state my views frankly and freely, irrespective of all personal considerations. If the physiological arguments and practical knowledge of the subject on which I based my advice have not met with acceptance on the present occasion, they will bear fruit hereafter. There were higher interests at stake than mere acquiescence in the voice of authority. The lives of millions of fellow-creatures, who could not speak for themselves, hung upon the question whether the proposed scheme of relief was one that might be safely adopted. In my opinion it was dangerously unsafe, having regard to the health and strength of the laboring poor. A very sad experience of the effects of inadequate food is now before Government in the history of the famine census, and before another famine visit the land I trust it may be practicable to lay down rules that will enable a famine-stricken population, able and willing to work, to earn a sufficient sustenance.

Other causes affecting the vitality of the people.

665. But the reduction of wages alone was not the sole cause of the rapid deterioration of the condition of the people. I wish to be absolutely impartial in my estimate of the various influences that reduced the vitality of the population, and I am bound therefore to notice the various factors in the order of their importance:—

(1) Reduction of wages and insufficient nutriment.
(2) Alterations in staple of food.
(3) Conditions of labor on relief-works.

666. When the food scarcity became apparent, the causes which had led to failure of grain crops led also to failure of pasture for cattle, and thousands of bullocks were sold for the value of their hides, and the flesh of the animals, until April or May, formed a very important feature in the dietary of the poorer castes. During my inspections in Cuddapah and Bellary in March and April, I was much impressed by the superb physique of many of the people employed on relief-works, and on enquiry it was found that those remarkable for their healthy and robust appearance were meat-eaters, and that meat being then the cheapest food procurable (a full sized bullock often sold for 12 Annas or a rupee) they had been largely subsisting on a diet of animal food. The fact of the subsistence of the lower orders to a great extent on famine bullocks was noticed by Surgeon Sturmer in the Nellore District. But as the cattle disappeared this source of food failed, and there was a great falling off in the condition of the people.

Change of food.

667. A great calamity to the people in regard to food was the almost complete failure of the millets, raggi, cholum, cumboo, and sami, which in ordinary times form the staple of their diet. The only cereal grain that was imported in any quantity to supply the population was rice, and the working people being unaccustomed to rice, there can be no doubt that the change to a diet deficient in albuminous matter helped materially to hasten the observed deterioration in health. It was curious to notice how, in Bellary and Cuddapah, where the people are quite unaccustomed to rice, they endeavored, instinctively as it were, to supplement the deficiencies of the rice diet by the use of peas, pulses, &c., imported from Bengal and Northern India. A small green pea, usually unknown to the people, was much sought after and was bought at a high price. Bengal gram (chenna) was also largely imported and eaten raw or parched.

668. Another very serious deprivation was the absence of all green vegetable food during the hottest periods of the year. I noticed a marked difference in the physical appearance of the people in river valleys and places where cultivation could be carried on to a small extent, and in the drier uplands; and the difference was, I believe, in a great measure due to the fact that in the one case green vegetable food had not entirely failed, while it had completely disappeared in the other. The very general absence of green vegetables and fruits no doubt predisposed the people to that scorbutic taint which was so marked a feature in the decline of vitality of the population.

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669. In regard to the influence of works on the health of the people, it must be noted that the agricultural laborers, weavers, and artizans, are not accustomed to the kind of work that was generally provided for famine-relief, *i.e.*, road-making, stone-breaking, repair of tanks and embankments. Work of this description is usually performed by a peculiar class of the people known in the south as "Wuddahs" or tank-diggers. The Wuddahs have an excellent organization of labor, and in ordinary seasons they do the most important part of the public works of the country, and act as sub-contractors for the Public Works Department. The Wuddahs, as a class, suffered less from the famine than any other portion of the laboring community, and wherever they could be employed on contract work, they managed to keep themselves and families in their usual strength and physical condition. The secret of their condition lay in the fact that with their communal organization, and division of labor, they could earn from 4 to 6 Annas a day for an adult, while every young child capable of carrying a basket found the means of earning something for the family support.

Conditions of labor.

670. But the great bulk of the people knew nothing about the distribution of labor, nor were they familiar with the use of the pick-axe or mamoty, so that the ordinary task-work, which to the "Wuddah" class would have been simple or easy, was to them really hard work.

671. In very few places were the people encamped near their work, and they often walked distances varying from 4 to 8 miles morning and evening to get to their employment. As a rule the men and women dragged their young children with them, and kept them out in the blazing sunshine exposed to heat, dust-storms, and occasional rain, so as to secure the allowance of ¼ Anna a day for each child unable to work; these long walks, encumbered by the weight of the children, unquestionably helped to exhaust the vitality of the people. All through the hottest months of the year—a season when the agricultural people as a rule do little or no work, except in the early morning and evening—the relief-works went on through the hottest period of the day, and I have seen men, women, and children struggling under their loads in midday, in the terrible heat of April and May, when the very crows sat gasping in the shade, unable to utter a single "caw." The result of this unusual exertion on the part of the people, aided by poor and insufficient food, soon became evident. In March and April the labor gangs of the Ceded Districts contained a fair proportion of men and women in good physique. In July the able-bodied had disappeared from the works, and only half-starved and emaciated creatures remained.

672. My own inspection of famine districts began with the town of Madras in February. In March I travelled through a portion of North Arcot and the upland taluks of Cuddapah. In April I visited Bellary and Adoni, and the relief-works in the neighborhood. In May my inspections were confined to the Chingleput District. In July I again visited Bellary and a portion of Kurnool and Cuddapah. In August I proceeded to South Arcot, where distress was fast increasing. In September and October I inspected the relief operations in Coimbatore, Salem, and the Neilgherries, and in December I made a tour to Madura and Tinnevelly. In these tours my attention was almost entirely directed to famine matters, and the arrangements for the relief of sufferers in camps and relief-houses, some details of which, as a contribution towards famine history, I have had to quote at what I fear must be regarded an inordinate length.

Personal inspection of famine districts.

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SECTION X.

VACCINATION.*

673. The report of the Inspector of Vaccination is directed by the Government of India to be made for the *official* year ending 31st March, instead of for the calendar year as all other vital statistics are made.

674. In the present year there has been considerable delay in the submission of the report, owing to the dilatory proceedings of certain Municipalities in neglecting to forward their returns, and it will be only possible to give in this place a brief abstract of the operations of the year, as the printing of the Sanitary Report was nearly completed on date of receipt of the Vaccination Report (31st August). The Vaccine report and tabular statements will be separately submitted for the orders of Government. I would mention here, however, that the different dates assigned for the vaccination and sanitary statistics, leads to confusion and much delay in the preparation of the Annual Sanitary Report, and that it would be a convenience to all concerned if the vaccination statistics could be made to agree will all other vital statistics, *i.e.*, for the calendar year.

675. During the official year (1877-78) 787,730 persons were vaccinated, or 304,538 in excess of the previous year. The great increase in numbers was entirely due to the circumstances of the famine, which brought the village people in crowds to relief centres and poor-houses, and advantage was taken of the opportunity to extend the practice of vaccination as much as possible.

676. While a good deal of extra work was done, I am of opinion that still larger results might have been shown if the Vaccinators employed in relief centres had been a little more zealous and systematic in their work.

677. The following abstract shows the agency by which the vaccine operations were performed :—

Departments.	Total of Operations.	Increase.	Decrease.	Net Increase.
Vaccine Districts and Vaccine Depôt.	685,890	278,401	...	...
Military Cantonments	6,790	1,550	...	...
Private Vaccinators	471	...	2,577	...
Medical Subordinates...	28,584	12,831	...	...
Municipalities	59,288	18,116	...	...
Zemindaries	6,113	2,266	...	...
Civil Dispensaries	584	497	...	...
Railway Apothecaries	10	...	47	...
Total ...	787,730	313,661	2,624	311,037

678. The total number of children under one year of age vaccinated was only 68,055, of children from one to six years of age 98,545, and of persons above six years of age 481,133. The total number of successful cases was 635,027, or an average of 83·2 per cent. of the cases operated on. This proportion would have been a great deal higher, only that on account of the migratory character of the population on famine relief the results of vaccination, whether successful or otherwise, could not always be ascertained.

679. The small number of infants under one year of age vaccinated, 68,055 against 477,477 births registered, shows how defective the voluntary system of

* This subject should form Section VII., but as the printing of the Sanitary Report was nearly completed when the Vaccination Report was received, it is therefore printed at the end as Section X.

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vaccination is. There is a great prejudice against infant vaccination, and if the people can help it, they won't have the operation done until the child is able to run alone.

680. The lymph in use has been generally good and effective, but in children much weakened by famine it was found that the operation did not always produce good vesicles.

681. *Vaccine Staff.*—Surgeon-Major J. Shortt, who for many years has superintended vaccine operations in this Presidency, retired from the service in February 1878, and has been succeeded by Surgeon J. Anderson Laing, M.D.

682. The regular staff consists of 38 Deputy Inspectors of the 1st or 2nd Grade and 535 Vaccinators (162 First-class, 281 Second-class, and 92 Probationers), but during the great prevalence of small-pox some of the Local Boards and Municipalities employed extra hands as a temporary measure. Under present regulations the Vaccinators are entirely the servants of the Local Fund Boards and Municipalities which employ them. The local authorities in fact are responsible for vaccination, and the public health department undertakes the inspection of the work done.

683. The salaries of the Deputy Inspectors of Vaccination are entirely paid by the several Local Fund Boards, and there is a somewhat strong feeling that these officials ought to be entirely under the direction of the Local Boards; but Government has ruled that their appointment, removal, dismissal, &c., from office is to be vested in the Sanitary Commissioner as head of the public health service.

684. During the past year the Code of Regulations for Vaccinators and Inspectors has been revised and published with the sanction of Government. The Inspector of Vaccination has been authorized to take a part in the general sanitary inspection of towns and villages, and has been constituted a Deputy Sanitary Commissioner.

685. Arrangements have also been made in the new rules to ensure that future candidates for the office of Deputy Inspector of Vaccination shall have some knowledge of elementary hygiene, preference being given to those who have had a regular medical training. In this way it is hoped gradually to utilise the services of these officials in general sanitary inspection as well as in directing district vaccination. At present the greater part of these men are unqualified by their education and training to be general Sanitary Inspectors.

686. *Cost.*—The cost of the vaccine operations in 1877-78 was Rupees 1,50,330-5-3, which distributed over 635,027 successful vaccinations, gives 3 Annas 9 Pies per case. The funds were provided as follows:—

	RS	A.	P.
Imperial	1,212	10	0
Provincial	24,434	0	8
Local	1,05,630	13	7
Municipal	17,491	3	1
Private contributions from Zemindars or Estate owners.	1,491	9	11
Total ...	1,50,330	5	3

687. During the past year the new rules in regard to salaries of Vaccinators and payment for work in excess of a fixed minimum, were not adopted by all the local authorities, but these matters are being gradually systematised and will soon be uniform.

688. My proposition to give Local Boards and Municipal authorities the option of making vaccination compulsory within their respective circles has been referred to Local Boards and Municipalities for report, and is still under the consideration of Government.

689. The tabular statements of operations and establishment, as required by the Government of India, are included in the appendix of statistical returns.

(Signed) W. R. CORNISH, F.R.C.S., Surgeon-Major,
Sanitary Commissioner for Madras.

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APPENDICES.

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APPENDIX I.

SANITARY AND MEDICAL ASPECTS

OF THE

FAMINE OF 1876-77,

BY SURGEON-MAJOR W. R. CORNISH, F.R.C.S.,
Sanitary Commissioner for Madras.

AND

NOTES ON THE PATHOLOGY OF FAMINE DISEASES,

BY SURGEON-MAJOR A. PORTER, M.D.,
Surgeon, 4th District, Madras.

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APPENDIX I.

THE SANITARY AND MEDICAL ASPECTS OF FAMINE.

CHAPTER I.

INTRODUCTORY.

The medical and sanitary literature of famine defective.

FAMINE literature in India is already too copious for easy reference, and promises to be still more bulky before the history of the late disaster in Southern India is fully worked out. But this literature, copious as it is, happens to be singularly deficient in regard to the effects of food-dearth in the production of disease and death.

In the volume compiled by Mr. J. C. Geddes, B.C.S., in 1874 on "*Administrative Experience recorded in Former Famines,*" and which volume is intended as a *vade-mecum* for famine officers, out of 441 pages of most valuable matter only 12 are devoted to the subject of "Disease during Famine." I feel therefore that the almost unique experience that has fallen to my lot during the past year ought to be recorded in such a form as to be available to those who shall labor in India when the workers in the recent famine campaign shall have passed away and be forgotten. For nearly the whole of the year 1877 my duties constantly led me to see the condition of the famine-stricken in the several afflicted districts, and in these duties I was most ably assisted by a staff of Medical Officers, who acted as Sanitary Inspectors, and whose reports are before me.* It is my desire, therefore, to record the sanitary and medical facts observed by myself and sanitary staff in such a form as to be a record of permanent value in future famine administration.

It would be futile to enquire how it is that in India the subject of famine in its sanitary and pathological aspects has been hitherto so superficially investigated. The appointment of special officers to supervise public health and to record the annual changes in population has been a comparatively recent thing in India. Before the system of registration of deaths was introduced, records of mortality were too vague and indefinite to yield any data as to the influence of famine on population. It is only of recent years that the sanitary view of the question has met with any attention, and I allude here especially to the experience of the North-West Province famine in 1861, the Orissa famine in 1866, and the Rajputana famine in 1869. The Behar famine in 1874, so far as I am aware, did not contribute a single fact to our stock of knowledge in regard to the influence of privation on disease and mortality. Indeed, when a famine affecting many millions of people is officially reported to have been successfully grappled with, and only 22 or 23 deaths from "starvation" reported, those who are practically acquainted with the subject may be excused if they express doubts as to the prevalence of any famine at all.

Physiological problems of famine.

The recent famine in Southern India has brought home to the authorities the fact that in the administration of famine-relief many complex physiological questions arise, which properly fall to the lot of the skilled advisers in public health to deal with. In the future, therefore, it may be expected that our famine historians will not so completely leave out of sight the physiological and pathological effects of privation, and that these subjects will be dealt with as becomes their importance.

Dearth of accurate knowledge in regard to the social condition of the Indian poor.

There is unfortunately a great want of accurate knowledge amongst European officials of India in regard to the social habits and mode of life of the Native poor. The food they eat, its amount and variety, the number of meals daily, and in fact all matters relating to the domestic life of the people, are hidden from

* The gentlemen were Surgeons McNally, Rogers-Harrison, Lawrenson, Sturmer, Lancaster, Williams and Maitland, of the Madras Medical Service, and Surgeons Gray and Macdonald, of the Bengal Medical Department. My acknowledgments are due to all of them for valuable aid.

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the gaze of the European official, who, unless he has a special turn for such enquiries, may pass a lifetime in the country without attaining any accurate information on these subjects. In the early part of the famine an officer of the Civil Service, high in rank, who speaks the languages of the country with the fluency of a native, and who has lived a quarter of a century amongst the people, was under the impression that an Indian cooly habitually took only one meal in the twenty-four hours. The subject had never been a matter of enquiry with him, and he based his impression on the fact that his office servants had leave to absent themselves once daily to cook their food. But when I explained the facts to him, he had no difficulty in assuring himself by personal investigation that a Native ordinarily takes two large and one small meal in the twenty-four hours, just as we do ourselves, and that his former experience, or impression, was based on imperfect observation. The habit of loose observation, so common to minds untrained in scientific methods of enquiry, has been answerable for much disaster in connection with famine administration in India. Men whose practical experience guides them aright in apportioning the food of a horse in relation to his work, go altogether astray when they have to deal with the question of the food of a human being in relation to labor or to recovery from privation, simply because they are content to accept inaccurate data, basing their experience on defective evidence and hearsay, instead of sifting the truth for themselves.

Wrong impressions from loose observation of habits of the people.

Again a very mistaken impression has got possession of the minds of Indian officials in regard to the meaning of the word "starvation."* Until the present famine brought the fact home to me I had no conception how confused and erroneous were the views generally held on this subject. It is evidently the common belief, both of European and Native officials, that no death can occur from "starvation" so long as a person is able to swallow food, or has the means of procuring food. I have known official reports gravely made that people have not died of "starvation," because they had food near them, or had had small sums of money about them at the time of death. All this confusion of description arises from ignorance of the truth that a chronic insufficiency of food induces such a wasting of the tissues of the body that no subsequent attention to the nourishment of the victims of slow starvation can remedy the mischief occasioned by previous ill-feeding. The true view of the question has not yet been clearly placed before the public mind, viz., that physiologists and physicans recognise two distinct forms of starvation, the acute and the chronic. With the acute form famine administration has practically no concern, as it is so rare that a case is seldom met with, except when persons are accidentally deprived of all nourishment; but with starvation in its chronic form—the daily insufficiency of food, and the resulting waste of tissue and vitality—famine officials have a right to demand that the experience of the past shall be put before them plainly and truthfully. Until the present erroneous and most unsound theories involved in the use of the term "starvation" be exploded, we must not expect much improvement in the practical methods of dealing with famine. In regard to this matter public health officials have a clear duty before them. They are bound to state the truth, to diffuse a knowledge of the truth as widely as possible, and to demonstrate to those who have no scientific training that chronic insufficiency of food among a people gives rise to diseased conditions of humanity that are more fatal in their effects than all the pestilential disorders that have ever afflicted the human race, and thus bring home to the comprehension of famine administrators that chronic starvation is one of the most terrible disasters that can happen to a population.

Popular misuse of the term "starvation."

Two distinct types of starvation—"acute" and "chronic." The latter form comes within the experience of famine officials.

Duty of public health officials in popularising knowledge regarding the forms of starvation.

* "Over whole of Madras Presidency famine is successfully combated, and *starvation* prevented."—*Telegram from Sir R. Temple to Government of India, 7th February* 1877.

"No man, woman, or child shall die of *starvation*."—*Government of India letter, 2nd February* 1877.

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CHAPTER II.

FOOD, LABOR, AND WAGES IN NON-FAMINE TIMES.

Food of the laboring poor.

To understand how a food dearth affects a community, we must have clear and accurate views in regard to the ordinary means of sustenance of a people.

The people of India are popularly supposed to be, in the main, a grain-eating people, and rice is usually thought to be the principal staple of their food. The late Mr. Buckle announced this as an axiom, and the reading public of the nineteenth century accepts the generalisation. But these popular notions are very wide of the truth. My own investigations regarding this matter have been limited to the populations of Southern India and the Deccan,* and I do not pretend to describe the ordinary food of the people in other parts of India. In the tract of country inhabited by the Dravidian races, it may be stated as a fact that rice is *not* the staple food of the working population, and that at the least five-sixths of the agricultural poor use this grain only as a luxury, their daily food consisting of millets such as cholum (*Sorghum*), ragi (*Eleusine corocana*), cumboo (*Penicillaria spicata*), and several other species of millets. In Northern India I believe it is the case that *pulses* are somewhat largely eaten to compensate for the deficient nitrogenous matter in cereal grains. They are eaten also to some extent in Southern India, but the lower classes who live by their labor prefer animal food, when they can get it, to the pulses, of which they use habitually but a small quantity in their daily food. Milk, ghee and curds constitute an important part of the dietary of all classes of the people, but the agricultural poor have no scruples about eating flesh-meat, fish (fresh or salted), game, field-rats, snails, and any other animal matter that is capable of conversion into wholesome food.

In the case of the laboring poor, therefore, we have to deal with a population that is accustomed to the use of animal food. During the early months of the famine many thousands of the people subsisted chiefly on the flesh of bullocks and animals that died, or were killed on account of the impossibility of preserving their lives, during the drought, and in the famine camps, where the poor came in by thousands to be kept alive, their great cry and longing was for a meal of animal food.

The diet of the Indian laborer not so simple as some writers have stated.

Some writers have made a great deal too much of the simplicity of the diet of the people of India. The Brahmans, who do no work requiring physical exertion, have usually been taken as a type of the laboring classes, but the diet of this section of the people is by no means simple, and, as a matter of fact, there are no classes of the population who are strictly "vegetarians" in their food. All classes use milk and curds freely, and butter, and I believe it to be the case throughout India that the laboring poor (though some may have religious scruples about eating cow's flesh) do not reject fish, fowl, mutton, or goat flesh. The very best workers we have in Southern India, the "Wuddahs" or tank-diggers, an aboriginal tribe, are omnivorous in their diet, and eat meat (chiefly pork) freely, a day seldom passing that they do not use animal food.

Quantity of cereal grain required by laboring persons.

In regard to the average quantity of grain that a laboring man in good health and vigor consumes, the lowest estimate, after careful enquiry, was 24 oz. of dry millet and rather more of rice. This amount is often doubled by those who work hard and have honest appetites. These enquiries were made very carefully some years ago, without reference to the subject of poor relief in famine times, and practically this quantity of cereal grain ($1\frac{1}{2}$ lb.) has been recently adopted by a conference of experienced Jail Officers as the basis of dietaries in Indian jails, where results have been tested and noted for years past with absolute precision. Sir Richard Temple has stated that the ordinary diet of a laboring adult in Bengal is taken, after statistical enquiry, to be 2 lbs. of rice, besides about $\frac{1}{2}$ lb. of fish, and pulse, with

* Report on Food and Prison Dietaries.—*Madras Medical Journal*, Vol. VIII., 1864.

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pepper and other condiments, and where the laborers in the South of India eat rice, 2 lbs. a day is considered about enough, but not too much, for his two principal meals. It is undoubtedly the case that when grain is plentiful and cheap the laboring poor eat more than the quantity above shown, but jail experience shows that about 24 oz. of cereal grain, the quantities varying slightly according to the richness of the grain in albumenoid constituents, is in addition to other essential components of a dietary, whether pulse or animal food, oil, salt, condiments, and green vegetables, sufficient to preserve the health and strength of a man doing ordinary jail labor.

Wages of agricultural laborers paid in kind.

It would be a great mistake to suppose that the agricultural laborer in Southern India receives payment in coin. From time immemorial wages have been paid in grain, or in permission to cultivate certain lands for the laborer's own use. Until long after the British occupation of South India, the laborer was a slave who could be bought or sold with the land, his master being under an obligation to provide him with food and clothing sufficient for his needs. Even to this day money transactions between the employer and his laborers are confined to loans, or presents for certain occasions, and these advances only tend to rivet more strongly the bonds which tie the laboring man to his village home and employment. It is most important to get correct notions in regard to this matter, and not to be led astray by the fact that on large public works, or in towns, wages are paid in money. The great bulk of the laboring agricultural poor get no money-wage, though on the whole they are not badly provided for in money's worth.

The value of the earnings of the laboring poor.

A few years ago the Madras Government collected some valuable information in regard to the earnings of the poor in the several districts, and the best and clearest account I can find of the system of employment and wages, is from the pen of H. E. Sullivan, Esq., then Collector of South Arcot, and now Member of the Madras Board of Revenue.

Mr. H. E. Sullivan's testimony.

Mr. Sullivan states—

"Agricultural laborers may be divided into two classes, those who form the regular farm staff and who are engaged at the rate of one man per plough, and the occasional hands who are taken on when required.

"When the first description of laborer is engaged, it is usual for the employer to make him an advance of money varying from 7 to 35 Rupees, which is known as the "Motha Kadan" or first loan, which binds him to the service of his master. Neither this loan nor any subsequent advances, which on the same principle he may receive from his employer, bears interest, nor is repayment of the capital sum demanded unless the laborer elects to quit the service. This class of laborers, although they are attached to the farm under the system above described, are not employed on it all the year round, and during certain months of the year their services are dispensed with, and they are at liberty to seek employment elsewhere, being bound however to come back when required.

"Whilst regularly employed on the farm, which is generally from June to November, they are paid monthly and in kind, never in money. The following are the ordinary rates:—45 Madras measures (about 157 lb.) veragoo, 11 measures (about 39 lb.) ragi, or occasionally 34 measures of paddy (unhusked rice) are substituted for the veragoo* monthly. When taken on again for the harvest which commences in December, the laborers employed receive as their remuneration five per cent. on the grain harvested. This is called "Callavasam," the laborers receiving 5 "callams" out of every 100 "callams" got in.

"The extra hands who are taken on when agricultural operations are in full swing are paid daily wages either in money, or kind, or both. If in money, the wage is one anna per diem and *two meals*. If in kind, two Madras measures of paddy (about 5 lbs. of cleaned rice) besides the conjee."

The mode of remuneration varies in different districts.

In different districts diverse customs prevail. In some the laborer is allowed certain privileges in cultivating for his own use. Everywhere he can grow a few ground-nuts for oil, chillies for his curry, and vegetables for family use, in addition to his share of the farm produce. So far as the actual means of subsistence therefore are concerned, the agricultural laborer is not, in ordinary years, so badly off as would at first sight appear. A Native official of the South Arcot District estimated that a laborer's wages amounted to 576 Madras measures of grain for a year. The "measure" weighs about 3½ lbs. According to this estimate he would receive more than 5 lbs. of grain a day, enough to support himself, wife, and

South Arcot.

* Veragoo is a small millet (*Panicum miliaceum*) in common use by the poor.

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three young children. But, as a rule, the wife when she works in the fields earns separate wages, as do the children who are old enough to labor.

Tinnevelly.

In Tinnevelly Mr. Brandt, C.S., calculated the earnings of a Pallar (servile laborer) and his wife at 2 measures of rice a day or about 7 lbs., worth about 36 Rupees a year.

Tanjore.

The Honorable V. Ramiengar, C.S.I., in reporting on the Tanjore District, of which he had personal experience, calculated the grain earnings of a laborer and family at 960 measures (of 3½ lbs.) per annum.

Salem.

Mr. Longley, Collector of Salem, reports that—

"In harvest time the laborers will not receive payment in money, but demand it in grain."

He says that laborers in his district are paid by a monthly grain-fee varying from 24 to 40 measures (84 to 140 lb.) of cholum, cumboo, or ragi, besides an annual ready-money allowance of from 2 to 5 Rupees. This mode of payment is one universally observed in all purely agricultural villages.

Salem Sub-division of District.

Mr. Price, of the Sub-Collectorate Salem, states that the customary arrangement as regards farm laborers is that the master gives from 3 to 5 Rupees a year, from 3 to 4½ "Kundagams" (130 Madras measures each) of ragi, and if he is a wealthy and liberal man, a couple of coarse cloths at the *Pongul* feast. Boys are hired by the year, the arrangement being that the master gives them their food, a place to sleep in, a small handkerchief for the head, a cloth, and a cumbli (blanket).

Malabar.

In Malabar wages are paid in kind and average daily two Madras measures of rice (7 lbs.) for a first-class cooly. The great majority of agricultural laborers are permanently entertained by the land-owners, and these are paid 1½ measures a day (nearly 5 lbs.) whether they work or not.

Godavery.

In the Godavery District the same practice prevails of paying laborers in kind. They get on the average about 2 "putties" of paddy a year, valued at about Rupees 40.

Mr. Stuart, of the same district, estimated the value of the food-wage at 50 Rupees a year.

Grain wages apparently ample for the ordinary wants of the people.

I have quoted thus freely from the experience of those acquainted with the social condition of the laboring poor, for the purpose of demonstrating that the assumption of Sir Richard Temple, that in ordinary years the laboring man in Southern India could not afford to eat more than a pound of grain a day, was without any foundation in fact.* The agricultural laborer may be badly off He is certainly not a free agent, but in the matter of material to fill his stomach in seasons of ordinary agricultural prosperity, he is just as well off as the agricultural laborer in Devonshire or Dorsetshire. Clothing, except for decency's sake, is an incumbrance, and a thing on which he has no call to spend money. Whatever trifle of cash he may be able to earn, goes, if he be a careful and industrious man, to help him in hiring land on his own account; if he be an idler and spendthrift, it finds its way to the proprietor of the nearest toddy-shop.

I have already quoted from Mr. H. E. Sullivan's report; but the following remarks of that able and accurate observer give so correct a view of the condition of the permanent farm laborer that I cannot omit them.

Mr. H. E. Sullivan's testimony as to the condition of the farm laborer.

"In regard to the permanent farm laborer, or as he is known in the south, the "Padial" or "Padiachy," it would not appear at first sight that his lot was a very prosperous one. The value of the grain which he receives as wages from June to November does not exceed, even at present prices, Rupees 2 per mensem. Twenty years ago, however, it did not represent a rupee, so that although he receives now the same quantity as he formerly did, he is certainly better off (for he cannot consume it all) than he was then. But he makes a great haul at the

* "The real point to be considered is whether in ordinary times they get more than one pound a day for a male adult. From inquiries in various districts of the Madras Presidency I apprehend that the laboring poor in several localities can hardly get more than one pound a day for a male adult in ordinary times."—*Minute by Sir Richard Temple, 7th March 1877.*

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harvest, and in addition he occasionally cultivates a small portion of his employer's estate on his own account. He receives, moreover, at the different festivals small presents from his employer, and on the occasion of a marriage or other ceremony in his own family, a loan to meet the necessary expenses is rarely refused.

"It is true that this system must more or less tend to prevent the laborer from ever emerging from that position, but this is not universally the case. Instances not unfrequently occur of these men setting up as independent farmers, although whether their condition is thereby ultimately benefited may admit of question. One bad season generally suffices to ruin them, and then they go back contentedly to their old place.

"I use the expression advisedly, for it is within my own tolerably varied experience that a bond of union exists in India between the landholder and his laborers, which prevents the latter, as a rule, from following the example of their brethren at home in striking for higher wages just at the time when their services are most needed.

"But the laws of supply and demand are inexorable, and although the landholder in India is prudent enough not to create an inconvenient precedent by raising the rate of wages whenever labor is in greater request than usual, he is still sufficiently alive to the requirements of the times by a judicious enhancement of loans and presents during the period of pressure, to secure himself against the difficulties which at this moment beset the farmers in England. There is, moreover, in this country a feeling of sympathy between the employer and his men which is not to be found in European countries, where the latter are regarded as so many machines out of which a certain amount of work is to be got, and that done the bargain is at an end.

"A mistaken philanthrophist might make capital out of the figures I have given, but my experience leads me to believe that the "Padial" in India, with his comparatively scanty wage, is better off than the farm laborer at home with his 9*s*. or 10*s*. a week."

The classes who are paid in money wages.

But passing on to the condition of other classes of the community besides the agricultural laborers, there are many people in India who work for money wages.

In towns and places where Europeans congregate, money payments for labor are the rule. The artizan classes, except in communal villages, as a rule are paid in money, and the professional earth-diggers (men who excavate wells and tanks construct earthworks, and who form the mainstay of the Public Works labor,) almost invariably take work on contract, and by their admirable system of subdivision of labor earn large money wages. In districts where Europeans have engaged in tea, coffee or cinchona cultivation, wages are calculated in money, though in many of these instances the employers, for the convenience of their laborers, keep a grain store and issue a part of the wages in grain. It is the general impression that money-wages have advanced from 30 to 50 per cent. in the last twenty or thirty years, and, as a matter of course, these money wages should bear some relation to the past and present prices of food.

Condition of the laborers on grain and money wages contrasted.

It is very doubtful whether the ordinary laborers who work for money wages are better off than those who are paid in kind. Their work is of a more irregular character, habits of idleness are engendered, and there is always the temptation to spend the surplus wage in drink.* The farm laborer, on the other hand, enjoys a secure position though his wages are low, and in seasons of plenty his share of the farm produce and his privilege of cultivating vegetables, oil plants, &c. on his own account, enable him to sell or exchange a portion of his grain wages for money or other commodities.

The prosperity of the farm laborers dependent on the harvests.

From what has been said it will be seen that the prosperity of the agricultural laborer depends in a great measure on the harvest, of which he gets five per cent. in addition to subsistence wages. When the seasons are regular and the harvests plentiful, there is evidently abundance of food for the farm laborer and his family; but when season after season the harvests are scanty, or fail altogether, it is clear that the customary share of the produce is insufficient to maintain the laborer. In these times there is reason to believe that the employers of labor, as a rule, stretch a point in helping their regular laborers to find sustenance, and they probably did so during the late famine time to the extent of their ability. I have known instances of wealthy farmers buying food to feed their laborers even when they had abundance of grain stored

* "Higher pay adds nothing to his comforts; it serves but to diminish his ordinary industry. It has been found on railways in India that the great increase of pay has neither augmented the rapidity of execution nor added to the comfort of the laborer."—*T. Brassey, Work and Wages.*

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in pits; but with many of the smaller farmers, the famine soon brought them to the condition of being unable to feed their own families, and the distress amongst this class, though coming somewhat later, was quite as real as amongst the laboring classes.

Conditions affecting food-supplies preceding famine.

Before the famine actually set in there had been a succession of bad seasons. The latter part of 1874 was noticeable for excessive rains, in which crops were destroyed and grain stores spoilt; 1875 for a scanty rainfall; and in 1876 both the south-west and north-east rains failed over a very wide tract of country. In the latter part of 1876 the food scarcity began to press severely on the people, the prices of the millets on which they mainly subsist having gone up from an average of 60 or 70 lbs. the rupee to 18 or 20 lbs.

Rise in value of food in 1876.

Famine affecting cattle.

The cattle began to suffer before the human population; the explanation of this circumstance is that the cattle depend on pasture and straw, and without rain these naturally were the first to fail, the people having some reserves of food-grains stored away.

Storage of millets for food.

The customs of the people lead them to keep in reserve considerable stores of millets. The practice is to eat old grain in preference to new. The stores are kept in under-ground pits, or in large earthenware receptacles built up within the house, and every farmer preserves in this way at harvest time enough grain to support his establishment throughout the year. Wealthy men keep a reserve stock sufficient to last for three or four years. It is always most difficult to get any accurate information in regard to the quantities of grain thus reserved for household use, or for local sale, but we know that the quantities must have been large, for our grain importations, as a whole, were not more than sufficient to feed nine millions of population for a whole year, whereas the famine area, including Mysore, which drew its imports from Madras ports, contains a population of more than 25 millions, and for more than a year this area grew but little food towards the support of the population. The habit of storing grain is a most excellent protection against famine. There is some reason for supposing that with improved means of communication and the stimulus of high prices the practice is not so generally followed as it used to be, and that domestic stocks are kept lower, but as all the millet-eaters prefer old grain to new, there is certain to be always a reserve of food sufficient to supplement a scanty harvest, though as experience has shown in 1877, not sufficient to carry the people through a succession of bad years. It is the fact that new millets often cause derangement of the bowels. The experience of successive generations has taught the people that old grain is more wholesome than new. The small millet known as "ragi" will keep sound, if properly stored, for twenty years.

Small margin of expenditure over earnings in ordinary seasons.

From what has been said it will be evident that even in the best of seasons certain classes of the people, especially those who have not regular agricultural or other employment, have very little margin of expenditure. Low living, amongst the poor who have no settled means of livelihood, is the rule, and the reports of every medical institution in the country prove that poverty and bad living are fertile sources of disease. The first effect of abnormally high prices of food was seen in old people past work, and in young children. These classes of the population, being dependent on the labor of others, fare well or ill according to the cheapness and abundance of food. The pinching in the daily supplies evidently began with the old and young of the laboring classes who had no settled occupations. It soon affected the agricultural laborers, who, having no harvests to reap, had no share of produce for their own maintenance. From these classes the distress spread to the small farmers, weavers, and village artizans dependent on the prosperity of the agricultural community.* Before the end of 1876 famine was sore in the districts of Kurnool, Bellary, Cuddapah, Nellore, North Arcot, Salem, Chingleput, and Coimbatore, and probably one-fourth of the population of those districts had then begun resorting to unusual articles of food to help them in eking out their scanty and decreasing supplies of food-grains.

Classes earliest affected by famine.

* The Mahomedans throughout the famine area appear to have suffered less than Hindus. But of the latter the out-caste or Pariah tribes were those who suffered most severely in the early months of the famine.

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CHAPTER III.

THE PHYSICAL SIGNS OF CHRONIC STARVATION.

The early indications of chronic insufficiency of food are familiar to most medical men, and are common enough amongst the poor in India even in seasons when there is no scarcity of provisions for those who can work. Famine only intensifies the prevalence of disorders that always exist in an impoverished people.

These indications are ANÆMIA and UNDUE WASTE of tissue, and a few words are necessary in regard to each before proceeding to the consideration of the secondary consequences of chronic starvation.

Anæmia.

ANÆMIA.—When the blood-forming constituents of food are habitually defective, there must naturally be an alteration in the character of the blood, and the group of symptoms we describe as "anæmia" are generally to be found in the under-fed. In the famine districts and amongst the laboring poor employed on relief-works, the characteristic symptoms of anæmia were generally very pronounced when the people applied for relief, and were always to be noticed amongst the gangs of laborers when looked for.

Surgeon Sturmer, the Sanitary Inspector of the Nellore District, found that of 5,433 persons in relief-camps, 1,116 were anæmic, and of 3,775 laboring on relief-works 853 were in the same condition. Of 3,281 persons receiving village relief 743 were anæmic. The proportion for the whole number inspected was nearly one-fourth. As those suffering from the advanced stages of anæmia (scurvy and dropsy) were classified by Surgeon Sturmer under separate headings, this proportion does not really show the amount of anæmia in the population. My own observations would lead me to classify at least fifty per cent. of the poor, in the time of greatest famine pressure, as anæmic, and I see that this was about the proportion noted by my Inspectors in some of the districts.

Condition of the anæmic.

In those beginning to feel the effects of insufficient food there was noticed great pallor of the mucous membranes. In those working in the sun and exposed to dust and glare, the conjunctival mucous membrane did not always show pale. It was in fact often preternaturally red, of a brick-dust color, from the irritation of dust and glare. But there was usually pallor of the lips, and invariably a white, pale, creamy tongue, and often feeble circulation and palpitation. As regards the latter symptom I have over and over again, in inspecting gangs of coolies drawn up in line, seen the movements of the heart knocking against the ribs, even at a distance of some yards from the people.

Amongst women and growing children there was a peculiarly sad and "drawn" expression of face, betokening anguish, the curved lines in the skin running from the side of the nose to below the angle of the mouth, being very distinct and prominent.

Wasting of body.

WASTING AND EMACIATION.—Whenever food was insufficient in quantity and quality, the people soon began to fall off in flesh. The Tamil races of Southern India are naturally rather short, but stout and well set up. The adult men in good health and condition weigh from 110 to 120 lbs. on the average, and women from 95 to 105 lbs. The women when young are naturally plump, with their angles well rounded, and with well-developed breasts. The men and women of the Telugu country run somewhat taller, and the women are not usually so plump as those of the south. In weight they do not differ materially from the Tamil races.

Disappearance of subcutaneous fat.

The first evidence of wasting was the disappearance of subcutaneous fat, and of the normal roundness and curves of the body. The skin appeared to be thinner than usual, and but loosely attached to the parts beneath. Later on, the deeper fatty structures began

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to disappear, especially in the gluteal, pubic, and inguinal regions, and in young women there was rapid absorption of the fatty deposits about the mammary glands. When I began the inspection of the people on famine-relief in March 1877, there was a general tendency to leanness of all classes. Ribs, clavicles, and "acromion processes" were unusually prominent, and superfluity of flesh was extremely rare. On one occasion, after inspecting about 3,000 persons, I found only one young woman who could be called "plump," and she had come to the works the day before and had not been previously exposed to bad living. But many of the men and women at that time had a fair amount of muscular development, and clean glossy skins. If inquiries were made in regard to the circumstances of those in such good condition, it turned out, in nine instances out of ten, that the people were of such castes that they could eat animal food, and further inquiry elicited the fact that they had been largely subsisting on the bullocks that had died, or had to be destroyed, on account of famine. In March, April and May, in many of our districts beef was, weight for weight, the cheapest food procurable. A full-grown bullock when wasted and famine stricken, sold for from 8 Annas to a rupee. The fact that the meat-eating classes at this period of the famine kept up their muscular power better than others was well established. The presence of these apparently well-fed and well-nourished individuals in the labor gangs, caused superficial observers to draw wrong inferences as to the extent and severity of the distress amongst them. They ate meat because the famine had brought an abundance of it, temporarily, to their doors, and the food nourished them; but the supply was of very precarious and uncertain duration, and the fact ought to have been accepted as a sign of the severity of the food dearth, instead of which there is reason to believe that the ruling authorities were at one time misled as to the real nature of the calamity, by glowing reports week after week of the physical condition of the laboring classes.*

Superior physique of meat-eaters in early period of famine.

Wrong inferences drawn from condition of the meat-eaters.

The actual laborers were naturally in the best condition, but even at this early date the food scarcity had told with great severity on the old and the young, and mortality throughout the famine country had become excessive. As soon as the meat-supplies were exhausted, the classes who used animal food fell off in condition with great rapidity. In Bellary the gangs I saw in April contained about 30 per cent. of emaciated persons. In July nearly all the people on works in this district were wasted, and it was a rare thing to find a man or woman in an effective condition for hard labor.

Rapid wasting characteristic of the population.

After a period of uncertain duration the wasting, primarily confined to the fatty and cellular tissues, goes on to affect the muscles and other structures of the body. An unequivocal and almost universal sign of chronic starvation was *flattening of the nates*. The rounded buttocks, whether of man, woman, or child, disappeared, and became perfectly flat and straight with the trunk. The muscles of the limbs shrunk away and atrophied, leaving the elbow and knee joints protruding like hard knobs. The adductor muscles of the thigh, and the fatty deposits in that region shrank so much as to show wide spaces between the closed legs. This was particularly noticeable in females, where the natural angle of the skeleton pelvis is greater than in men. Every rib and bony process of the body became prominent, and with the gradual waste of body tissue, the strength and energy, and desire for life, disappeared.

Wasting of muscles and other tissues following disappearance of fat.

Flattening of the nates.

From Dr. A. Porter's pathological investigations of famine-stricken bodies it would seem that the brain and nervous system wasted like other structures, and whether this be the explanation or not, it is very certain that as vitality decreased there was a lethargy and indifference as to their fate, which in many cases prevented the people from striving to help themselves or availing themselves of the means of living. I am inclined to attribute this characteristic of the famine-stricken not to laziness or obstinate determination to die, as has been suggested, but to actual

Brain atrophy.

Lethargic condition of the people.

* "They were for the most part ...... in admirable condition, and bearing no signs of ever having missed a meal."
—*Memorandum on Inspection of Coolies by Sir Richard Temple at Goondacul, 22nd February 1877.*

waste and destruction of brain and nerve tissue, and consequently impaired function of the nervous system.

Wasting atrophy of the organs of assimilation.

It is exceedingly difficult to draw a line between the anæmia and wasting that may be recovered from, under favorable conditions of food and nourishment, and the graver forms that will not so yield. Coincidently with the wasting of the external frame, degenerative changes are taking place in the internal structures of the body. The mucous membrane of the alimentary canal, and the special anatomical structures engaged in the absorption of albuminous nutriment from food, waste away under chronic privation just as all other structures of the body, and when these changes within have occurred in such a degree as to interfere with the digestion and assimilation of food, the danger to life is enormously enhanced. The progressive degenerations are so gradual, and so little noticed either by the individual or those about him, that he may be mortally-stricken before anybody is aware of it.

Every physiologist knows the extreme danger of a chronic deprivation of some essential article of food, and the example of the ill-fated Dr. Stark of Edinburgh in experimenting on his own person is a sufficient warning of the danger involved; but administrators in India have yet to learn, and appreciate the great truth, that in famine times fatal injury to the functions of assimilation occur long before the victims are brought within any scheme of public aid.. Physiology, as well as practical experience alike teach us that any scheme of general assistance to the poor, to be of use, must be set afoot before these symptoms of impoverished blood and tissue waste have become general; and whatever else a system of famine-relief may embrace, a due provision of daily food alone will enable the people to emerge from the disaster with vitality and energy unabated. In this matter the great error of the past has always been in confounding the effects of *acute*, with those of *chronic*, starvation. In acute starvation there is no time for the fatal degenerative changes of the assimilating structures, and nutriment judiciously given, even in the last stages of exhaustion, will be absorbed and restore the waning vitality. In chronic starvation the victims die, because the structural changes dependent on long continued wasting of tissues, prevent the conversion of food into force and energy.

Erroneous views in regard to the different characteristics of acute and chronic starvation. The latter, a diseased condition practically irremediable.

Extent and proportion of body waste in famine.

The degree to which wasting of tissues goes on in the bodies of those subjected to chronic starvation has been ascertained with tolerable accuracy. We know the average weight of the adult laboring classes in Southern India, in ordinary seasons, is of men from 110 to 120 lbs. and of women from 95 to 105 lbs., and we now know very fairly what their average weight was after they had suffered from privation.

Dr. A. Porter, the Medical Officer of the 4th District, Madras, was good enough to investigate the pathology of famine diseases in the pauper wards of his hospital, and during the year 1877 he made careful examination of the bodies of 181 males and 121 females who had undoubtedly died of the results of "chronic" starvation, and this is his account of heights and weights:—

Dr. A. Porter's record of weights of persons dying of chronic starvation.

"The majority of the bodies were mere skeletons, with legs tucked up on the abdomen, the walls of which almost touched the spine. Coming under this head are 181 males averaging in height 5·4 feet (extremes 4·58 and 5·92 feet), and in weight 77·1 lb. avoirdupois (extremes 54 lb. and 113 lb.); and 121 females averaging in height 5·0 feet (extremes 4·58 feet and 5·66 feet), and in weight 61·4 lb. (extremes 40 lb. and 102 lb.)

"The ages of the males varied from 18 to 70 years, and of females from 15 to 65. The average ages of the males was 41 years and of females 44 years."

Dr. vanSomeren's experience.

In the relief operations at Palaveram, amongst the coolies employed on works, Dr. vanSomeren, Deputy Surgeon-General, weighed a number of men and women, showing an average amount of wasting in March 1877, and found the following averages of weight:—

	Men.	Women.
Average age	37·54	35·04
Do. height, feet	5′-3·6″	4·11′
Do. weight, lb.	83·6	70·54

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At another relief centre (Poonamallee) in the same district, where the population had not arrived at the same stage of privation, Dr. vanSomeren found the following results in weighing the people who were employed on works:—

	Men.	Women.
Average age	34·2	31·84
Do. height, feet	5′-5·4″	5·1′
Do. weight, lb.	97	80·76

Dr. Æ. M. Ross' weighments.

Dr. Æ. M. Ross, of Nellore, who conducted a number of laborious experiments in the weighing of coolies on relief-works and in camps, found on his first weighments in March the following averages:—

	Men. lb.	Women. lb.
1st series	92·12	76·2
2nd do.	89·7	83

The ages of the men averaged 29·5 years and height 5·2 feet, and of women ages 31·2 years and height 4·11 feet.

Weights of under-trial prisoners in Nellore immediately before famine.

In the same district the average weight of "under-trial" prisoners in the Nellore Jail, just before the famine-relief began, was found to be 109·13 lb. men, and women 92·3 lb., and these weights were unquestionably below the average standard during times of prosperous seasons and abundant food.

Two-fifths of normal body weight lost before death.

It is apparent therefore from this record that in chronic starvation in famine times the body gradually wastes from an average of, say, 115 lb. for men, down to 77·1 lb. at the time of death, and in women from 95 or 100 lb., to 61·4 lb. All medical authorities agree that when *two-fifths* of the normal weight of the body has wasted, death is imminent, and the practical experience of the famine in Southern India has amply confirmed the fact that when this amount of wasting has taken place life cannot be preserved. Indeed, death very frequently takes place before this tremendous loss of tissue has occurred.

Extreme body wasting.

In the experience of the famine many marvellous examples of extreme wasting were noted. To those who witnessed the sights afforded by our relief-camps and centres of labor, it was always a source of wonder how vitality could be preserved in these living skeletons. I have seen in hundreds of instances poor creatures in whom the skin appeared to be tightly stretched over the bony frame-work of the body, and in whom no muscle whatever could be traced in the body outline. One of these poor waifs, a little child of 7 or 8 years of age, I took into my own house to see what care and good food would do. She lived for six weeks under careful nursing, but never digested, or assimilated food so as to gain flesh. A storm of rain with a sudden reduction of temperature of the air by 7 or 8 degrees brought on rapid congestion of the lungs, which destroyed life in a few hours. In this case there was no pain, no loss of appetite throughout. The circulation was feeble and the body temperature below the normal standard. Life hung upon a thread, and the sudden lowering of temperature from 85° to 78° Fahr. was enough to sever the frail tie. Experience in thousands of such cases in our relief hospitals shows how futile are efforts to deal with the effects of famine when the people have been permitted to waste away. Public money spent on comforts for the sick, while soothing the path to the grave, was entirely wasted, so far as a restoration to health was concerned. The only economical application of State funds in famine times is in the early help of the able-bodied poor to maintain their vigor, and the mode of accomplishing this end is a task demanding the exercise of the highest qualities of famine administrators.

Normal course of such cases.

The prevention of extreme wasting the only way of saving life.

Other consequences of famine.

But while undue waste of tissue is the most general physical attribute of the famine-stricken, there are other conditions induced by privation which have to be noted in some detail. We find, for instance, that long-continued poor living induces a form of scurvy, dropsies, and disorders of the alimentary canal; that in the famine-stricken changes occur in the skin and hair; that in the young growth and development are arrested; that the

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reproductive functions in women are suspended; that the mammary glands shrink, and cease their functions in nursing mothers.

Scurvy.

SCURVY.—The ordinary form of sea scurvy I have never seen amongst the natives of India, that is, of bleeding and spongy gums with a tendency to extravasation of blood beneath the skin, and deposits of fibrin in the calf of the leg or ham. But there can be no doubt at all that there is a form of scurvy, which may be named "land scurvy," and that the population of India in times of drought and scarcity are very liable to suffer from it.

Deficient supply of fruit and vegetables in famine times.

It must be understood that in ordinary seasons fresh fruit and vegetables play an important part in the dietary of the people. In many parts of the country the plantain and various species of yams are used just as much as the potato is in Europe, and every month brings a profusion of fruits and vegetables which help materially in eking out the deficiencies of a grain diet. Before a grain famine can affect the people, they must have suffered from a partial or complete deprivation of green vegetable food, for when the natural rains or water-supply fails, all vegetation is in a great measure in abeyance. A very significant fact came home to me during the famine in regard to the deprivation of the people of their accustomed food. Limes are usually to be had in every village bazaar, the juice being used to give a piquancy to the curries. In a journey of about 200 miles I made through the heart of the famine tract of North Arcot and Cuddapah in March 1877, I could not buy a lime in any town or village where I halted. And everywhere the same difficulty occurred in the matter of vegetable food. Throughout the drought period the markets were very indifferently supplied with vegetables.

Land scurvy noticed at Coimbatore in 1857.

The present year was not my first experience of "land scurvy." When Civil Surgeon of Coimbatore 20 years before, I made acquaintance with the disease as it appeared amongst the poor during a time of drought and scarcity. I found that about 70 per cent. of the newly-admitted prisoners had discolored, spongy or bleeding gums. They came into jail mostly for grain thefts, and were starving. While under good diet with vegetables and lime-juice, most of these cases did well, and soon had a healthy condition of the gums restored, *the mortality from this class of prisoners ran excessively high.* The worst cases continued to lose flesh, became dropsical or got diarrhœa, which proved most intractable in treatment, and ultimately died precisely as the people did during the late famine.

Characteristics of land scurvy.

Blue discoloration of gums.

The great bulk of the people who suffered from scorbutic symptoms had a deep purplish blue discoloration and thickening of the gums, marked most distinctly in the upper jaw. In a good many cases there was ulceration, bleeding, and loosening of the teeth, but the most common cases were a spongy thickening of the gum near the teeth, varying in breadth from one or two to six or eight lines. There was no undue sensibility of the gum where ulceration was absent, but the thickened and discolored portion was sharply defined from the healthy structure adjacent, and followed the festooned outline of the teeth. Some observers have thought that this condition of gum was due to pigmentation in dark races, but that this was not the case is certain, from the fact that in healthy natives the gums are precisely of the color of those in white races. I have seen the discoloration and thickening in young children; and in passing down rows of men, women, and children, some would be found to have the appearances described distinctly marked, while others would be found with healthy gums. According to my own observation this scorbutic taint was most marked in the districts which were most devoid of water, and where green vegetable food was scarce. After rain had fallen and the poor were able to pick up green succulent food, the scorbutic symptoms began to disappear. The peculiar condition of the gums was sometimes seen in persons who had not perceptibly lost flesh, and who appeared to be otherwise in fair health. When the discolored line of the gums was a quarter of an inch or more in breadth however, there was generally evidence of loss of muscular power and failing strength, and the complication, in reference to the physical condition of the people, was regarded as unfavorable.

Scorbutic symptoms most common in districts where green food was scarce.

Prevalence of the discolored gums regarded as unfavorable.

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Scorbutic terminations.

The *sequelæ* of this scorbutic taint are, according to Indian experience, a low form of dysentery or diarrhœa, or general anasarca. These diseases used to be the bane of Indian jails, and to be productive of very high mortality; but since jails have been under skilled supervision, and dietaries have been improved so as to supply adequate and varied food, they have been almost banished, and jail death-rates have declined almost to those of the ordinary population. One of the greatest triumphs of Indian sanitation has been the victory over diseases of innutrition in jails. But even a proper dietary in jails cannot undo the mischief of bad feeding outside, and so it happens that when want and privation press on the people, the jail mortality always indicates the fact.

This was the case in regard to the population of Behar in 1874, and our jail experience in Madras in 1877 shows unmistakably the terrible condition to which the prisoners were reduced before their incarceration.

The prevalence of scurvy amongst the famine poor.

In regard to the extent to which this scorbutic taint prevailed amongst the famine-stricken poor, I think I am within the mark in saying that in the dry hot months of the year from 60 to 70 per cent. of the people had the blue discoloration and thickening of the gum, though probably not in five per cent. was there actual ulceration of the gum substance, or spongy bleeding. In some cases however I have seen the swelling of the gum of the upper jaw so marked as nearly to hide the teeth. Concurrently with these symptoms *anæmia* and *wasting* were very prevalent, and I cannot give a better account of the physical condition of the poor than by quoting from a few of the inspection reports of my sanitary staff, who were instructed to classify the condition of the people as "fair," "thin," "emaciated," "anæmic," and "scorbutic."

Dr. Maitland's report.

Inspection Report, Dr. J. Maitland, 20th August 1877, Madura District, Relief-camp, Chinanoor.

—	Men.	Women.	Boys.	Girls.	Children under 7.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Fair	5	15	28	35	32
Thin	51	67	40	52	46
Emaciated ...	44	18	32	13	22
Anæmic ...	51	57	52	15	28
Scorbutic ...	44	55	64	65	54

This classification affords a very fair sample of the state of the people when they came under notice for gratuitous relief. Dr. Maitland noticed in this district that the swelling and blue discoloration of gum were very general, and that these symptoms often occurred in young boys and girls who were not otherwise apparently out of health. In another part of the country he reported:—

"A good many of the children had ulcerated gums, and one or two were bleeding."

In another instance,

"Physical condition very poor, children much reduced. In some there was ulceration of gums; in nearly all the gums were swollen."

In this camp more than 80 per cent. of the children were returned as "scorbutic."

Surgeon Sturmer's report as regards Nellore District.

Surgeon Sturmer of Nellore continually noticed the presence of scurvy. Of a gang of laborers he writes under date 27th May 1877:—

"These relief laborers were very scorbutic; the women were twice as bad as those in camp. In the camp fresh vegetables were given daily, hence the comparative disparity."

Of another gang he remarks:—

"On the whole the gums were firm, and did not present that peculiar festooned appearance so common, and which it seems to me is the first stage down-hill."

Again, in another inspection,

"In five out of the twenty scorbutic cases the gums were bleeding."

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Here is another extract—

"In some the gums had fallen quite away from the teeth."

In another village, 22nd September :—

"Fifty per cent. of children in good condition; very free from scurvy. Gums good color and firm."

Here is one more extract—

"One child, an orphan and without relatives in the village was very emaciated and dropsical, and also anæmic, and its gums were bleeding."

Cancrum oris.

Report, 14th October—

"One child, æt. 4, a mere skeleton, presented a most pitiable spectacle; the whole of its lower lip had sloughed away, the teeth and gums were exposed: the stench was abominable."

Surgeon McNally, Cuddapah District.

Surgeon McNally, Sanitary Inspecting Officer of the Cuddapah District, notes the scorbutic taint also. He says (20th May 1877) :—

"Anæmia, œdema of the feet and face, soreness and swelling (not bleeding) of the gums, and night blindness are common amongst young and old."

Surgeon Macdonald, Salem District.

In the Salem District Mr. Macdonald reported—

"Scurvy and anæmia very common amongst the laborers."

Dr. Rogers-Harrison, Coimbatore.

Dr. Rogers-Harrison, of Coimbatore, reported symptoms of scurvy very general at Mettapolliem camp. At another place, "of 70 women examined, 28 were anæmic and 33 with spongy and ulcerated gums." Again, in another gang of 154, "67 had spongy and ulcerated gums."

In another part of the district, later in the season, it is noted :—

"Many were anæmic and showed signs of scurvy, but the sponginess of their gums was not so well marked as I have seen in some gangs, probably due to vegetables being more plentiful in this taluq since the beginning of the monsoon."

Surgeon Williams, Bellary District.

Surgeon Williams, of Bellary, who expected to see scurvy as described in books, was disappointed, but he remarked, 23rd July 1877 :—

"I saw no case of pronounced scurvy, though many had a swollen, puffy, and sometimes slightly ulcerated condition of the gums, which would occasionally bleed on pressure, and in looking for other confirmatory symptoms such as cutaneous hæmorrhage, loosening of the teeth and foul breath, I was often disappointed; and, as regards the hæmorrhagic patches, they were obscured by the dark color and dirty state of the skin. I have recorded in the tabular statement those instances which I thought might be attributed to a scorbutic taint, though there were many others who had a condition of gums which I considered due to a cachexia from insufficient nourishment."

Again (27th August) Dr. Williams writes :—

"To account for the very few cases of scurvy which appear in my reports, I may state that the cooly population appear to eat more green vegetable material in the shape of leaves, &c. than they would in ordinary years, as whenever I examine a native's cooking-pot I always find a lot of boiled leaves, which he probably takes more for the purpose of filling a vacuum than for the nourishment derived."

Surgeon Lancaster, North Arcot District.

Surgeon J. Lancaster, writing of the North Arcot District, remarks that the people used very largely the young leaves of the tamarind tree, which contain much vegetable acid, and to the free use of these leaves he attributed the comparative rarity of scurvy in the district; but I had ample opportunities of noting that the blue swollen gums were common in this district as everywhere else within the famine area.

Significance of the diseased condition of gums.

I have quoted thus freely from the observation of others, because I deem it of importance that the significance of the diseased gums should be understood by the medical profession. This condition may exist without wasting of the body, and in such cases it probably points to defects in the quality of the diet; but when it is seen to accompany anæmia and wasting, it possibly means defect in *quantity* as well as *quality*.

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Under any circumstances it must be regarded as pathognomic of defective nutrition. In my experience as official visitor of jails, I have never known this symptom to be common without grave diseases following in its train, such as dropsies and jail dysentery. When this scorbutic cachexia has appeared amongst prisoners previously healthy, it has been usually traced to tampering with the dietary, or to some defect in the food. It is generally relieved by vegetable acids, or in some cases by the issue of sour curds, or unfermented palm-juice, of which the native in his own domestic life is very fond.

Experience of jails.

This is the only form in which I have seen scurvy affect a Native population. Purpura and extravasations under the skin, or fibrinous deposits in the muscles, have not been noticed by myself or the Sanitary Inspectors; but the condition of the gums may be regarded as a very fair index of the condition of a people in regard to the variety and abundance of their food.

Peculiar condition of tongue and mucous membrane of the mouth.

In addition to the cachectic condition of the people as shown by the condition of the gums, there was noticed in several of our relief-camps a peculiar condition of the tongue and mucous membrane of the mouth. The tongue in all bad cases of chronic starvation got coated with a thick white fur, but in many of the people this fur was seen to crack and peel off in strips, leaving a raw red glazed and painful surface underneath. The epithelium of the lips and interior of the mouth also peeled away, leaving raw surfaces, and the angles of the mouth were often excoriated. In young children the condition was something like aphthous ulceration. This disorder was exceedingly common in the Monegar Choultry Camp in Madras in April and May 1877, and appeared to be obviously connected with some defect in the camp diet, which contained $1\frac{1}{2}$ lb. of rice for an adult, besides dhall, vegetables, ghee and curry-stuff, but no animal food beyond about 1 ounce of meat a week. The Madras Government at my suggestion got Surgeons-General Gordon, C.B., and Smith, M.D., to examine the people and decide whether the diet ought not to be modified by adding meat and vegetables. These gentlemen quite agreed as to the necessity of the measure, and under the improved dietary the symptoms gradually subsided; but it appeared to me and to Dr. Thompson, the Medical Officer of the Monegar Choultry camp, that this condition of the mucous membrane of the tongue and mouth was a stage or development in the scorbutic cachexia from which so large a portion of the people suffered. In the Coimbatore District Jail this aphthous condition of the mouth and gullet appeared in an aggravated form, and many deaths were occasioned by it.

Dr. Gordon's experience of famine and scurvy in the siege of Paris, 1870-71.

Surgeon-General Gordon, C.B., one of the high administrative Medical Officers who supported my proposition for an improved dietary, has recorded in his excellent "Lessons in Hygiene and Surgery" his personal experience of famine and scurvy during the siege of Paris :—

"Not only did the scorbutic diathesis occur in a pronounced form amongst large numbers of persons, and more especially amongst the troops occupying the forts and advanced posts, but in the latter part of the siege there really were few, if any, persons in Paris who were not more or less affected by scurvy; that the physical force of all was impaired is undoubted. The sense of incapacity for the usual amount of exertion, and the speediness with which fatigue occurred, were palpably felt by individuals. Very many suffered in some measure from spongy gums, readily bleeding when touched; many persons, and it was asserted women more especially, manifested a liability to internal hæmorrhages, and to other conditions easily recognizable as being connected with a scorbutic state of body."

From the 4th September 1870 to 18th March 1871 the deaths in Paris numbered 78,000, against 25,000 in the corresponding period under ordinary circumstances. Children and old people died in the greatest proportion. Diarrhœa and dysentery owing to inferior and insufficient food were very fatal. (M. Sueur, *Lyon Medicale.*)

We see from these brief extracts that the effects of famine, whether in a besieged city or amongst the laboring poor of India, are practically the same. The organisation of human beings is the same everywhere, and a chronic insufficiency of daily food in any clime or country results in the same train of pathological conditions. There is nothing special in the organisation of the Indian cooly that

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will permit him to live and labor for prolonged periods on scanty rations, and the sooner Indian administrators grasp this fact and practically apply it, the sooner will success attend their efforts in checking abnormal waste of life during famine seasons.

"Famine Skin."—*The condition of the skin* in the famine-stricken was recognised and described with great faithfulness by the late Dr. Donovan in his account of the Irish famine. Dr. Donovan's paper will be found in the *Dublin Medical Press* of 1848, and I can vouch for the accuracy of his description.

An ordinary observer looking at a famine skin would be inclined to remark that it was dirty, but if he took the trouble to investigate a little more closely, he would find that it was "dirt" that soap and water would not remove. The famine skin consists of a scaly and degenerated epithelium, adhering tightly to the living skin beneath. It is best observed on the neck, chest, and trunk and between the shoulders, and my friend Dr. D. D. Cunningham, who has looked at it microscopically, tells me that the epithelial cells have undergone a fatty transformation. This peculiar scurf is darker in tint than the skin itself, and is often patchy, being more distinct in some parts than in others. It can be picked off by scratching with the nail, but ordinary washing does not remove it. The presence of this degenerated epithelium gives a harsh dry sense to the touch. The skin in famine cases has lost all its gloss and smoothness. One of the earliest and most satisfactory indications of recovery in the famine-stricken is the gradual peeling away of the degenerated epithelium and a return of the smoothness and refraction of the skin. The condition of skin first described by Dr. Donovan, I believe to be absolutely typical of defective nutrition. I have no doubt if it be carefully sought for it may be found associated with poverty at all times and seasons, but when I have had to examine thousands of coolies stripped to the waist, it has been found as a very general accompaniment of severe privation amongst persons of all ages. It must be noted that the inunction of oil, which is usually prevalent amongst natives after bathing, was greatly in abeyance during the famine, on account of the scarcity and dearness of the lubricant, and that diseased conditions of skin were thus more prominently brought into view. The fact should be noted in this place, that in all my experience of relief operations, I never saw a *cook* or person employed about the kitchen of a relief-camp with this famine skin. This, I take it, was due to the fact that the people in such positions were practically unlimited in their rations, and that they got as much food as sufficed to keep the tissues of the body from wasting or undergoing degenerative changes.

Condition of skin typical of defective nutrition.

Absence of famine skin amongst "cooks."

Alteration in Hair.—There was another change in respect to the hair, common enough at one period of the famine, but not so generally prevalent as the scurfy skin. There was an atrophy apparently of the pigment cells of the hair. The ends of the hair instead of remaining of a uniform black color, became red, auburn, yellow, or straw-color, the change being quite as pronounced as the colors in a "black and tan" terrier. I have seen in young children the body completely covered with long yellowish-white hairs, and the hair of the head down to its roots quite pale, with all the black pigment taken out of it. The altered conditions of hair were very noticeable in children, young people, and women, who had been long exposed to privation without coming under relief. The reports of my Inspecting Officers testify to the frequency of these altered conditions of hair, and the fact was familiar to all who had to deal with famine-relief. In young children the hair on the body became preternaturally long, but devoid of pigment. The hair of the head often stood out straight and bristly, like the staring coat of a famine bullock.

Alterations in the pigmentation of hair.

Effects of Famine on the Nervous System.—The languor and depression of the famine-stricken have been noticed in the experience of former famines, and the late Dr. Cutliffe, an excellent observer, thus records his impression of the mental condition of the people in the North-West Famine of 1861 :—

"But they were not only ill-nourished and poor blooded; they were also suffering from great nervous depression both before and after admission into hospital. * * From the first to the present time the great mental depression of the sick in hospital has been most remarkable, and many instances have occurred of men who refused to take food on the plea that they did not desire to live, either because their villages have been in part deserted and

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their families scattered, or that they had lost their children or nearest relations, or sustained in some way or other some severe trial of their affections and had succumbed to despair."

The late Colonel Baird-Smith, R.E., remarked:—

"Long before I read the medical report just quoted from, the aspect of deep depression common to all the real sufferers by the famine had struck me everywhere. I am familiar of course with the bearing of natives generally under suffering, and know them to be often easily borne down by it; but I have never before seen such an aspect of desolate despair as many of them presented, all of whom, till this great calamity struck them down, had evidently been able to support themselves and their families by honest and independent toil in husbandry and otherwise."

Example of lethargy and indifference during the Viceroy's visit to a camp.

I was very much struck by this peculiarity of the famine-stricken when His Excellency the Viceroy paid a visit to the famine relief-camp of the Monegar Choultry. In a large hospital-shed, full of sick and dying, not a head was raised when His Excellency and Staff entered it. The patients lay perfectly still, apathetic and indifferent, as if all earthly considerations had ceased to trouble them. And the same languor and apathy was noticed everywhere amongst the real sufferers. The desire for life had gone out of the people. Thousands of them remained in their homes, not caring to live, and waiting for death, when they might have been relieved had they been able to display ordinary energy in seeking the humane provision of the Government. Thousands also were brought in by the police or village authorities when the time had passed by to afford them substantial succour. The mental condition of the famine-stricken is a subject calling for scientific investigation, and it cannot be disposed of by statements of loose observers that the people die through sheer obstinacy. In the general wasting of the body, the brain and nervous centres are imperfectly nourished, and undergo degenerative changes, not so rapidly perhaps, but in the same fashion as other portions of the body, and we have to regard the mental depression and impaired nerve function as inevitable consequences of slow starvation.

The mental condition of the famine-stricken a subject for scientific investigation.

Condition of the brain.

The pathological investigations of Dr. Porter help us to appreciate the fact that the nervous system shares in the general waste of the body. In regard to the condition and weight of the brain, he states:—"The average weight of the brain in the 181 emaciated males is 41·4 ounces, with a ratio to their average body-weight of 1 to 30·5, and in the 121 emaciated females 37·2 ounces, with a ratio to their average body-weight of 1 to 26·3." Now in plump and well-fed Hindus Dr. Porter found the average brain-weight of males to be 41·8 ounces, and in females 38·1 ounces; and the ratio of brain-weight to body-weight to be 1 to 38·2 in males and in females 1 to 35·8. It is evident that the brain does waste perceptibly in the famine-stricken, but not so rapidly, or in so great a degree, as other structures of the body.

Dr. Porter's conclusion is as follows:—

"From the above results it would appear that the brain wastes in starvation like other tissues of the body, but in a less degree; and this atrophy of the brain would account for the effusion of serum into the arachnoid cavity and sulci of the brain, that is so frequently found in these cases."

What physical and mental symptoms should we expect to find where the brain and nerve tissue has slowly wasted? Should we not, from our acquaintance with the physiology of the nervous system, expect to find the mental faculties dulled and lethargic, some insensibility to pain, and inaptitude for bodily exertion?

These are undoubtedly the characteristics of the famine-wasted poor, and the pathological condition of the brain explains the symptoms.

Dr. Porter's researches moreover show us that there is nothing strange in the fact that the famine-stricken are dull, apathetic, inapt for labor, or unwilling to use the smallest exertion to better their condition. These symptoms are a part and parcel of the disease "chronic starvation," and must in future be so regarded and treated. Wherever a famine occurs these impaired mental conditions follow on bodily suffering. We might as well punish a raving lunatic for offences committed during a paroxysm of madness as deal harshly with the so-called "obstinacy" of

Necessity of considering the impaired brain and nerve function in dealing with the famine-stricken.

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the starved poor. When these symptoms of impaired nerve function become evident in a population, starvation has already had the people in its grip, and we must be prepared to deal tenderly and humanely with the victims, just as we do with those whose bodily emaciation is evident to the eye.

The lethargy of starvation, when we come to think of it, is a beneficent provision of Nature. If the people are to die of chronic hunger, it is better that their sensibilities should be dulled, that the desire for food and life should be diminished in them, and that a torpor of the brain and nervous system should keep them indifferent to bodily suffering. If there was exalted activity of the nervous system, the agony and suffering of the afflicted would be enormously increased. The pity of it is that an industrious and well-disposed population should, through great natural calamities, be brought so low in physique as to undergo brain and nerve atrophy, and thus become unfitted to continue the struggle for life.

ARREST OF GROWTH AND DEVELOPMENT.—I regret that opportunities for exact observation under this head were but few. The subject was not lost sight of, and in regard to the arrest of puberty in females the attention of the Sanitary Inspecting staff was specially directed to the necessity of careful observation. But for periodical weighing or measuring of young persons exposed to famine influences great practical difficulties interfered, especially in keeping under observation for any length of time the same individuals.

Loss of weight in growing boys and girls.

According to some observations made by Surgeon-Major Æ. M. Ross, of Nellore, young boys and girls on relief-works steadily diminished in *weight* during a period of three months that they were under observation, but their growth in height for this time is not recorded. Our medical staff, in fact, was too busily engaged in attention to the sick and dying to institute or carry on observations of this nature, which were specially difficult owing to the nomadic tendencies of the people under observation. Even the apparently simple matter of testing the condition of the people on labor by periodical weighings was frustrated by the constant fluctuations in the *personnel* of the labor gangs.

Retardation of puberty in females.

As regards the question of retardation of puberty in females as evidenced by sexual development, there can be no question that prolonged poor living does exercise such influence. Natives of India are well aware of the fact that females of the better classes who are well fed arrive at puberty earlier than those of the lower classes who are less delicately nurtured. A common idea with them is that good feeding will hasten the marriageable age. In the famine our observations were chiefly confined to the poorer classes, who in ordinary years are the slowest to arrive at maturity.

Surgeon Sturmer's enquiries.

The results of Surgeon Sturmer's enquiries are given below:—

Condition of Girls 12 to 14 years of age.

	No.	Arrived at Puberty.	Percentage.
Relief Camps	168	38	20·4
" Works	204	48	23·5
Villages	95	23	24·2

I think these results show that there was a decided retardation in the period of puberty amongst the famine-stricken. I believe that even amongst the poor menstruation is rarely delayed beyond the 13th year. Surgeon Sturmer remarks:—

"In some cases the girls appeared to be considerably over 14 years, but had not arrived at puberty. The glands were more or less developed in a large number of cases, but the total percentage of those who had arrived at puberty, 22·7 per cent., is small."

I have myself frequently seen young girls who from their physical growth should have been women, with no indication of the ordinary signs of puberty. The same was observed also in reference to growing boys, but the indications were not so clear and conclusive as in the case of girls.

In regard to the arrest of puberty in girls, it would be tiresome to burden this paper with extracts from Sanitary Inspecting Officers' reports. The following by Surgeon MacDonald and Dr. McNally is given as specimens of the evidence:—

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Surgeon MacDonald, Salem District.

3rd September.—"There were 14 girls between the ages of twelve and sixteen. Of these only one had the appearance and acknowledged having attained puberty. The remaining 13 had no mammary development, and said they had not *come of age*.

Dr. McNally, Inspecting Officer, Cuddapah :—

Dr. McNally, Cuddapah.

"Very few girls of sixteen or seventeen had any mammary development."

Diminished fertility of the famine sufferers.

REPRODUCTIVE SYSTEM.—One of the first things that called my attention to the effects of famine on the reproductive system was the fact that children born in our camps, often from the moment of birth, presented the wizened and spider-like appearance of the half-starved. In these miserable little infants there was the characteristic flattening of the nates, loose skin, shrivelled limbs, and peculiar expression of face of the famine-stricken. Now these appearances in the newly-born must have resulted from defective nutrition *in utero*, and thus it became a question to ascertain whether the conditions interfering with the proper nourishment of the infant in the womb would not ultimately affect the reproductive functions to such an extent as to interfere with conception. So early in the famine as February 1877 it was noticed by me that the proportion of pregnant women among the famine-stricken appeared remarkably low. I directed the attention of Medical Officers and famine officials to the fact, and in my instructions to the Inspecting Sanitary staff, requested them to pay particular attention to the subject. The result of this enquiry, aided by the birth-registration in the famine districts, has been to place, beyond all cavil or doubt, the great fact that in famine times there is atrophy and wasting of the reproductive as of all other tissues, and that during a continuance of the food distress the reproductive powers of a population are most seriously affected.

Former famine history silent in regard to diminished fertility of population.

In the history of Indian famines, there is nothing to show that this important feature of a food dearth has ever attracted the notice of previous observers. Registration of births in India is a thing of yesterday, and there were no figured data to direct attention to it, while the famine of 1877 was the only one, so far as I know, in which arrangements were made for the systematic health inspection of the distressed people. If therefore I am able to produce evidence in regard to this matter that is new to the scientific world and to students of famine literature, it is because the Government of His Grace the Duke of Buckingham and Chandos, in its wisdom and humanity, gave me the helpful aid of a body of intelligent officers to visit and watch over the welfare of the famine afflicted people, and because the Madras Government has of late years encouraged and endeavored to improve the system of registration of vital statistics.

Effect of famine on mammary glands.

In regard to the shrinking and waste of the mammary glands in females, the fact was patent to every body who had to deal with the famine-stricken. In the Tamil districts the lower classes of the women do not clothe the upper part of the person, so that no professional investigation was necessary to ascertain the condition of the breasts.

The shrinking of the breasts from absorption of fat was one of the earliest indications of wasting in women, but as the distress increased the structure of the gland itself seemed to disappear. In many cases the gland could not be felt, nor was there any evidence to show that it existed. If any glandular structure remained, it must have been in a rudimentary form. In Indian women who have borne children, the breast is always pendulous and unshapely, but during the famine this pendulosity disappeared, the skin was tightly stretched over the ribs, and the size and shape of the nipple only remained to prove that the woman had borne children.

Evidence of Surgeon Sturmer.

Surgeon Sturmer, a very careful and accurate observer, in a general summary of his inspections, remarks :—

"Breasts of women were in many cases completely absorbed, and nothing remained but a nipple and a dark areola to point where the mammary gland had been."

I am aware that the complete destruction of a gland from wasting disease must be a rare pathological event, and my impression is that rudimentary gland

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structure did remain, even in cases where there was no evidence of it to sight or touch; but I have little doubt that the wasting, both in the case of mammary glands and ovaries, was of such a nature, in many instances, as to leave permanent results in regard to the future capacity for child-bearing.

Effects of famine on menstruation.

Menstruation.—The inquiries made by myself in regard to the normal condition of this function in the famine-stricken, went to show that the secretion was scanty and irregular in the younger women, and that it had ceased prematurely in those of more advanced years. In many instances of severe emaciation in young women the function had temporarily ceased.

Rarity of pregnancy in advanced period of the famine.

Pregnancy.—As the severity of the famine increased, it was a rare thing to find pregnant women on the works or in relief-camps, and the normal proportion of women in that condition had undoubtedly very much diminished. It must be remembered that in India it is accounted a disgrace to have a daughter of marriageable age unmarried, that consummation of marriage follows the first menstruation, and that usually a larger proportion of women are exposed to child-bearing influences than in European countries. An Indian birth-rate in seasons of abundance of food is unquestionably very high, though our system of voluntary registration of births has never yet shown the true proportions of the birth-rate. The only data I have been able to obtain in regard to the normal proportion of pregnancies in women of marriageable ages is in respect to wives of European soldiers in India, of whom 22 per cent. bear children, or abort, every year. These data of course apply to person s of a different race, but there is no reason to suppose that Indian women under the same conditions are less fertile. In fact the ascertained growth of Indian populations would lead to the supposition that the fertility of the people was in excess of that of European nations. In the Tanjore District, which is a fertile and thickly-populated area of country, with all the defects of our birth-registration we have succeeded, year after year, in registering an annual birth-rate of upwards of 30 per mille of population.

Evidence of the rarity of pregnancy in famine sufferers.

Some of the Inspecting Sanitary Officers made notes of the number of pregnant women present in gangs of relief laborers. Thus I find Surgeon Williams of Bellary, in May and June, notes the inspection of 4,811 women on relief-works, of whom only 40, or less than 1 per cent., were pregnant. Surgeon Sturmer, in his village inspections of women under 40, estimated the proportion of pregnancies to be 1·1 per cent. Of a total of 15,110 women inspected by him in reference to this question he found 206 pregnant, or in the ratio of 1·4 per cent. In Coimbatore, of 1,683 women at work, Surgeon Rogers-Harrison noted only 2 pregnant. In North Arcot Surgeon Lancaster comments on the rarity of pregnant women in the camps or on works. Surgeon Maitland in Madura, noting the condition of 3,296 women, finds only 15 pregnant. Dr. McNally, in his notes of inspections of Cuddapah District, records 272 pregnancies in 21,951 women examined, or 1·2 per cent. A liberal allowance must be made in all these cases for the number of women who had passed the age of child-bearing, but even supposing one-half of the people to have been of advanced age, still the proportion of pregnancies is remarkably small. In the Madras relief-camps, with an average strength of more than 11,000 paupers, men, women, and children, and a constant succession of new arrivals, for a period of ten months, during which more than 100,000 passed through the camps, there were only 39 births during the year 1877.

Evidence of registration statistics.

But after all, the best evidence of the effect of the famine on the fertility of the people is to be obtained from the birth-registration in the months corresponding with the intensity of food-distress.

Birth registration declining month by month, according to intensity of famine pressure.

The birth and death registration in India is not compulsory by law, but while during 1877 the death registers in famine districts have been recording four, five or six times the average mortality, the birth registration has been declining, going down to the lowest minima in the months of the present year which corresponded as regards the duration of pregnancy, with the intensity of the famine distress.

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The subject in its statistical aspect has been fully gone into in the section of the Annual Sanitary Report for 1877 relating to the civil population, but the accompanying diagrams will serve to show the registered birth-rate of some of the chief famine areas after the food scarcity, in relation to the average registration in former years, and I think no one can look at these curves without seeing how seriously this hitherto unnoticed effect of famine in India* must affect the normal increase of population.

Illustrative diagrams of diminished births in famine districts.

It has been suggested that the diminished birth-rate may be accounted for by the absence of the husbands of the family in search of work. There was no doubt a great disruption of family life during the famine, but on the other hand there was a great deal of promiscuous herding of the people. With the lower classes the marriage tie is somewhat a loose one, and changes of partners are not infrequent, and I have evidence to show that these changes were very frequent in the early period of the famine. In the selection of laborers in the Bellary District to go to public works in Nellore, I noticed that although the gangs contained a definite proportion of men and women, it was exceptional to find amongst them couples who owned to be married. There can be no doubt that the sexual instincts were diminished when bodily wasting set in. In the large relief-camps I ascertained that immoralities were rarely reported, and when they did occur, it was chiefly from the irruption of strong able-bodied men who had no business in the camps. It must be remembered also that up to the end of 1876 the family life of the people had not been disturbed, while the birth-rate shows a decline from a very early period of the famine, proving that the food dearth had been telling on the reproductive functions before the physical distress had become general. Even in districts where there was no actual famine, and to which the famine wanderers migrated, the dearness of food seemed to have caused a decrease in births. Taking the whole Presidency, the registered births were fewer by 25 per cent. in 1877 than the average of the two former years, and in 1878, up to the present time, the birth-rate has continued exceedingly low, scarcely one-half of the average, proving that the causes of infertility were of a general nature, affecting especially the classes of people who had suffered from privation. In my opinion a large number of women above the age of thirty, who in normal circumstances would have continued fruitful for some years to come, have been rendered permanently barren by the degenerative changes that have taken place in their ovaries and mammary glands. The condition of the mammary glands is one that can be tested without a pathological investigation; and when we find that gland so wasted that trained observers question whether it is not wholly lost, we may infer that the changes have been so vast that the function of the organ is gone for ever. The inference may be drawn also that wasting changes in the ovaries, leading to cessation of function, may be of such a nature as to impair fertility. I regret that Dr. Porter's pathological notes do not touch on the condition of the generative organs, and that I omitted to call his attention to the subject; but I allude to the subject here, that future observers in famine times may investigate the pathology of the reproductive system in reference to the phenomenon of diminished fertility.

Sexual appetite diminished by famine.

Probable permanent injury to reproductive functions.

Secretion of Milk.—The number of young infants depending on the maternal secretion of milk who perished during the famine period was truly appalling. In many cases the mothers appeared to be fairly nourished, and in camps they were supplied with a liberal and nutritious diet, but, I am sorry to say, with very little effect in the preservation of infant life. I have seen many thousands of infants who, in spite of the liberal provision for the mothers, and extra milk given to themselves, pined away and died with all the symptoms of starvation. In the great majority of women whose children fell into

Effect of famine on milk of nursing mothers.

* I observe in Dr. Gordon's "Lessons in Surgery and Hygiene," that M. Sueur noticed that during the siege of Paris, "Conception, as indicated by the subsequent occurrence of births and abortions, descended to less than half their usual ratio." The causes were attributed to inanition, "fatigue," "night-duty of the men," "decrease in marriages," and "moral unrest."

In the Government Cattle-breeding Establishment at Hoonsoor, the births of calves diminished from 58 per cent. in 1875-76 to 26·4 per cent. in 1876-77, from which fact it would seem that the human population is not singular in this respect.

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this condition, the breast milk was deficient in quantity and very thin and watery, and there was a tendency for the secretion to cease altogether.

Analysis of human milk in famine cases.

I asked the Chemical Examiner to be so good as to test specimens of milk from the famine-stricken mothers in the relief-camp, and compare the results with those obtained from the milk of healthy mothers in the Lying-in Hospital, and I have to thank Mr. W. Hamilton, the Chemical Assistant, for investigating the matter.

The analyses are too few in number to afford any conclusive data, but they appear to show—

(1) A diminution in total solids,
(2) Do. in salts,
(3) Do. in casein

in the milk of famine mothers, which results might *à priori* have been anticipated.

Analyses of Human Milk from Relief-camp, Royapuram, Madras, 10*th July* 1877.

——	Age of Child.	Percentage of				
		Total Solids at 212° F.	Fat.	Ash.	Solids not Fat.	Casein by Wanklyn's Process.
No. 1 Sample from Relief-camp.	10 months.	12·43	5·38	0·199	7·05	1·81
„ 2 do. ...	3 „	12·38	3·08	0·137	9·30	3·00
„ 3 do. ...	8 „	11·53	3·25	0·116	8·28	2·69
„ 4 do. ...	7 „	9·97	1·22	0·107	8·75	2·38
„ 5 do. ...	5 „	10·26	2·79	0·155	7·47	2·53
„ 1 from healthy female in Lying-in Hospital ...	...	14·7	4·17	0·329	10·53	Undetermined.
„ 2 do. ...	...	13·74	4·23	0·213	9·51	3·69
Analyses made on 21st August 1877.						
No. 1 from Relief-camp, Royapuram	10 months.	10·9	2·70	0·18	8·20	4·0
„ 2 do. do. ...	7 „	13·7	5·74	0·15	7·96	3·38
„ 3 do. do. ...	11 „	13·0	5·73	0·12	7·27	3·09
„ 1 from Lying-in Hospital, Madras.	1 week.	13·09	4·21	0·22	8·88	3·53
„ 2 do. do. ...	1 „	13·02	1·98	0·24	11·04	3·68
„ 3 do. do. ...	1 „	12·04	2·67	0·28	9·37	4·3

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DIAGRAM showing the BIRTH RATE per mille per annum in the undermentioned Districts in 1876, 1877 & 1878 compared with average of 5 previous years ending 1875.

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DIAGRAM showing the **BIRTH RATE** *per mille per annum in the undermentioned Districts in 1876, 1877 & 1878 compared with average of 5 previous years ending 1875.*

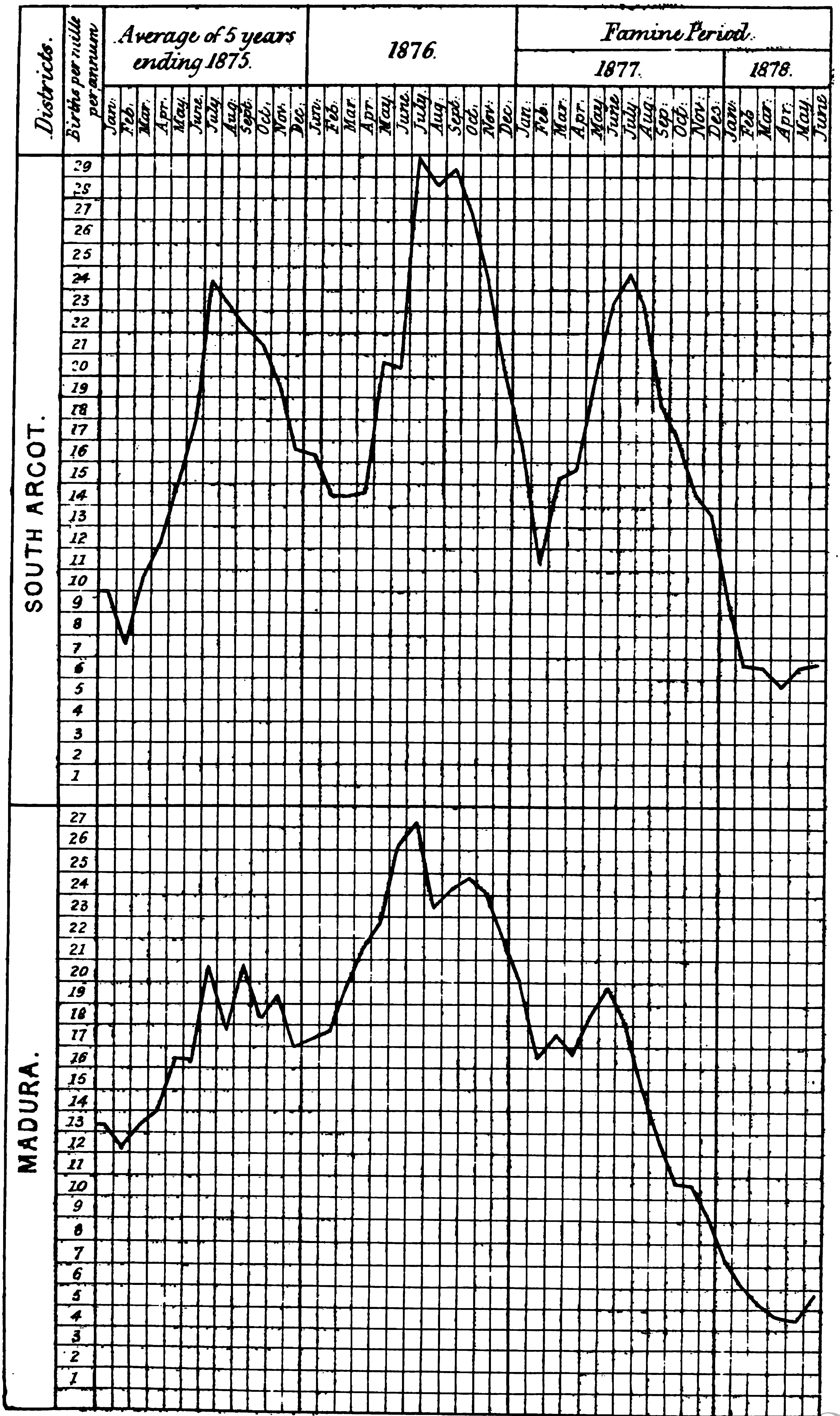

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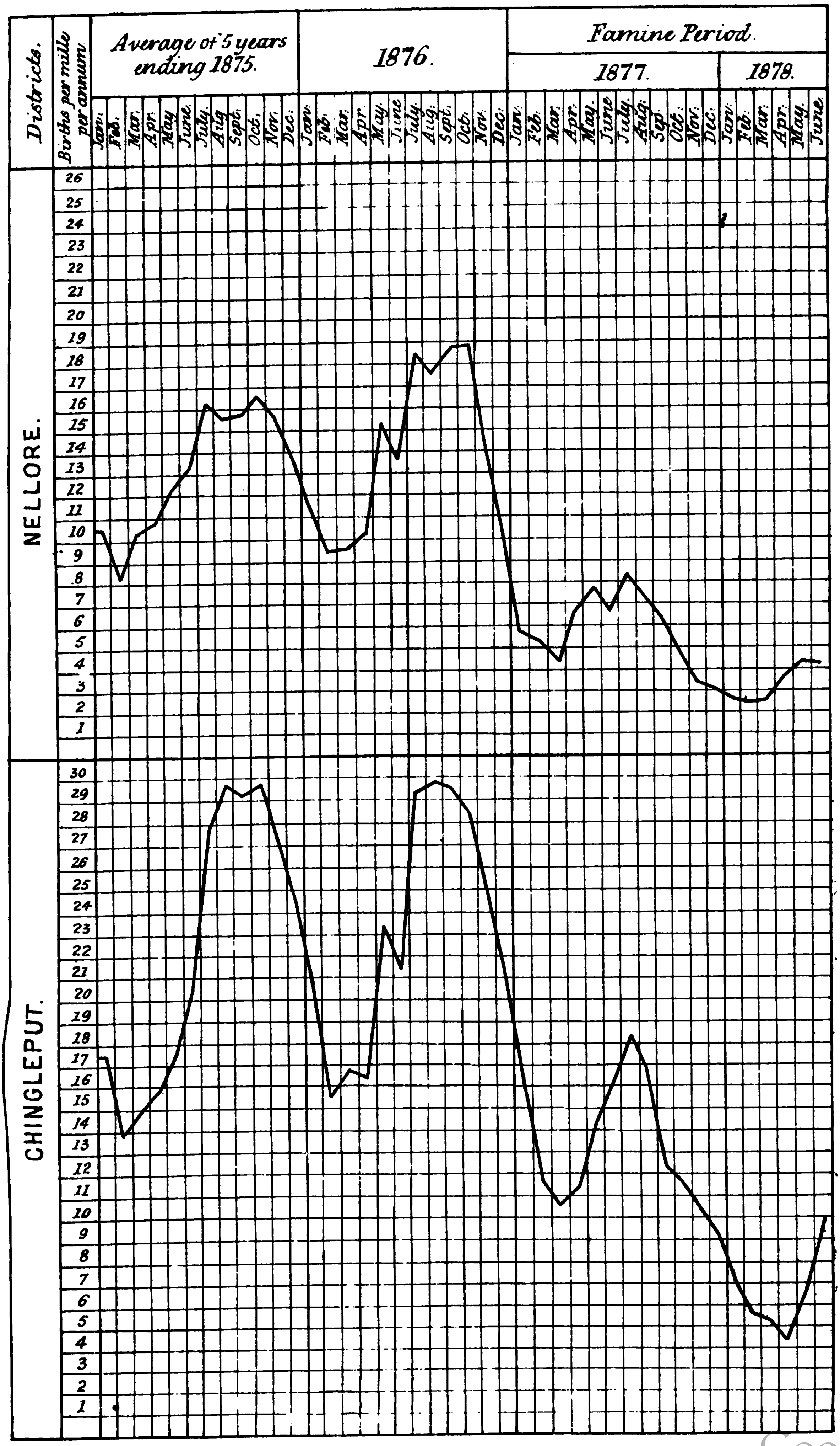
DIAGRAM showing the BIRTH RATE per mille per annum in the undermentioned Districts in 1876, 1877 & 1878 compared with average of 5 previous years ending 1875.



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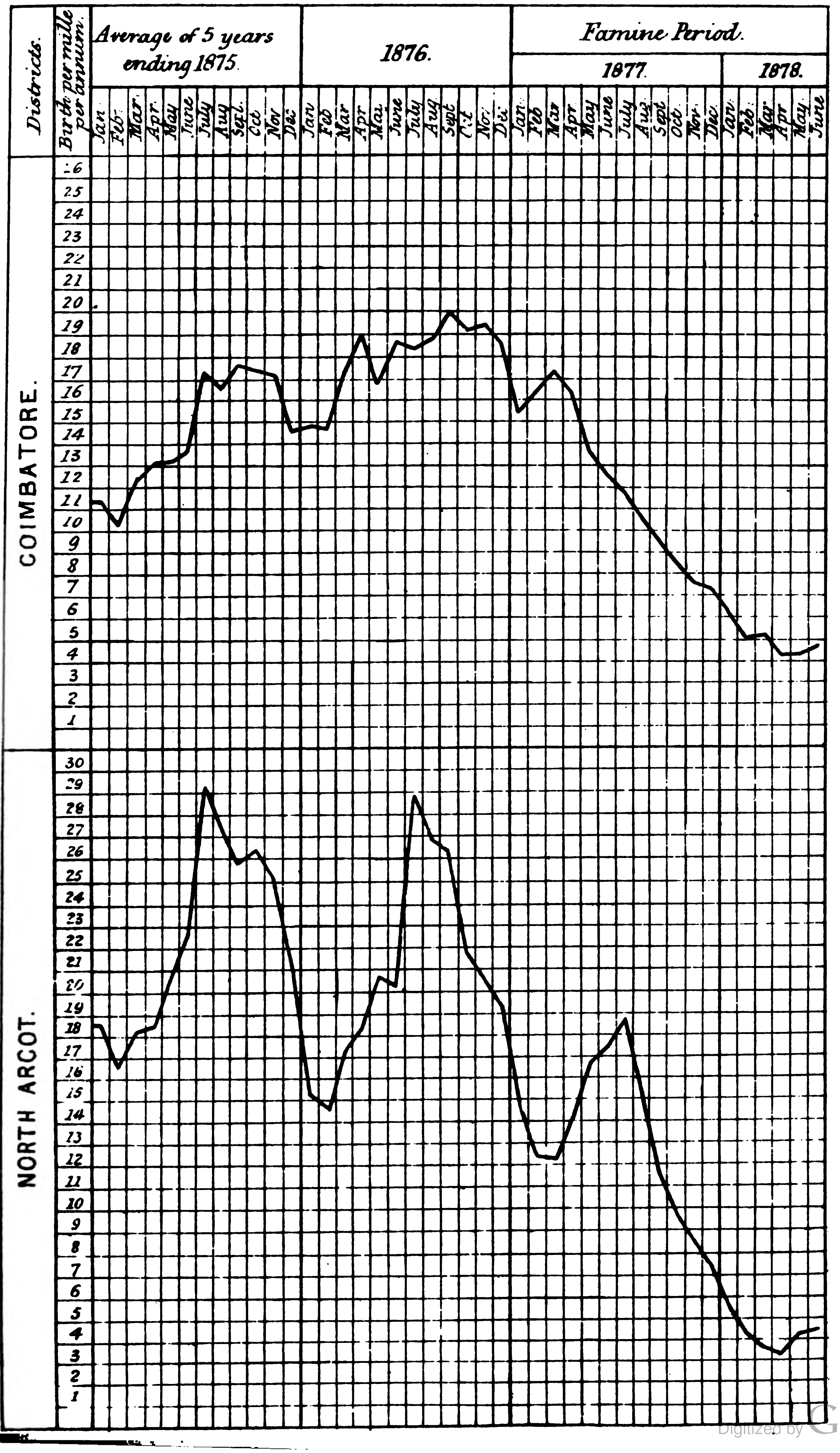

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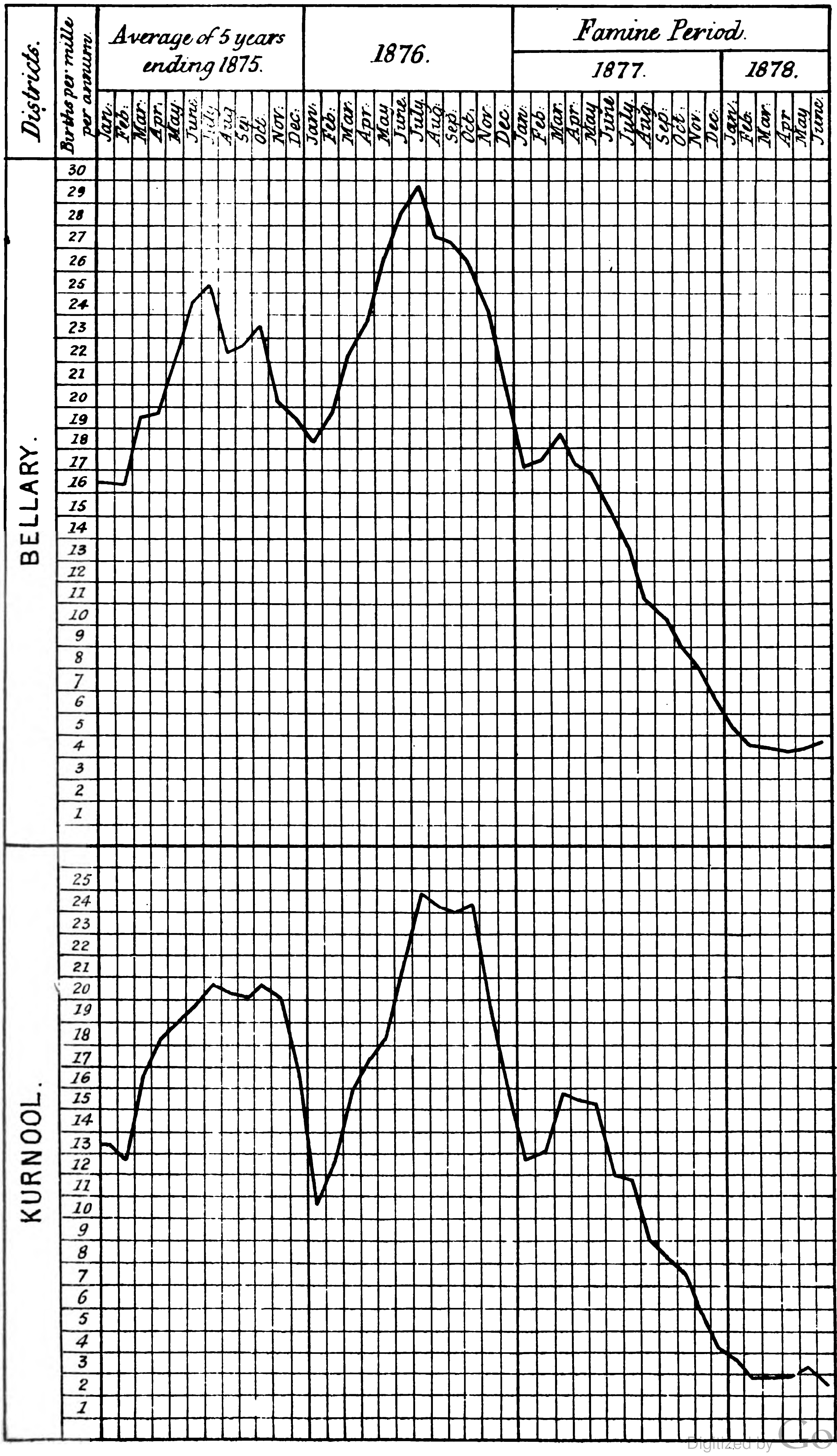

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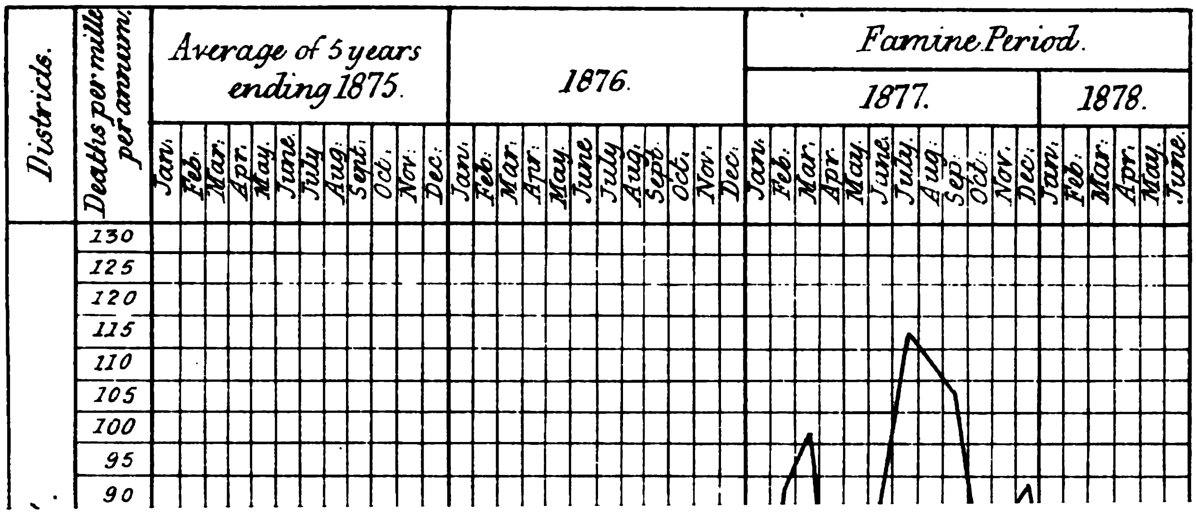
DIAGRAM showing the DEATH RATE *per mille per annum in the undermentioned Districts in 1876, 1877 & 1878, compared with average of 5 previous years ending 1875.*



NOTE.

Owing to the difficulty of including the mortality curves of the several districts in one sheet, the scale of the diagrams of death-rates has been reduced to *one-fifth* of that of the diagrams of births.

W. R. C.

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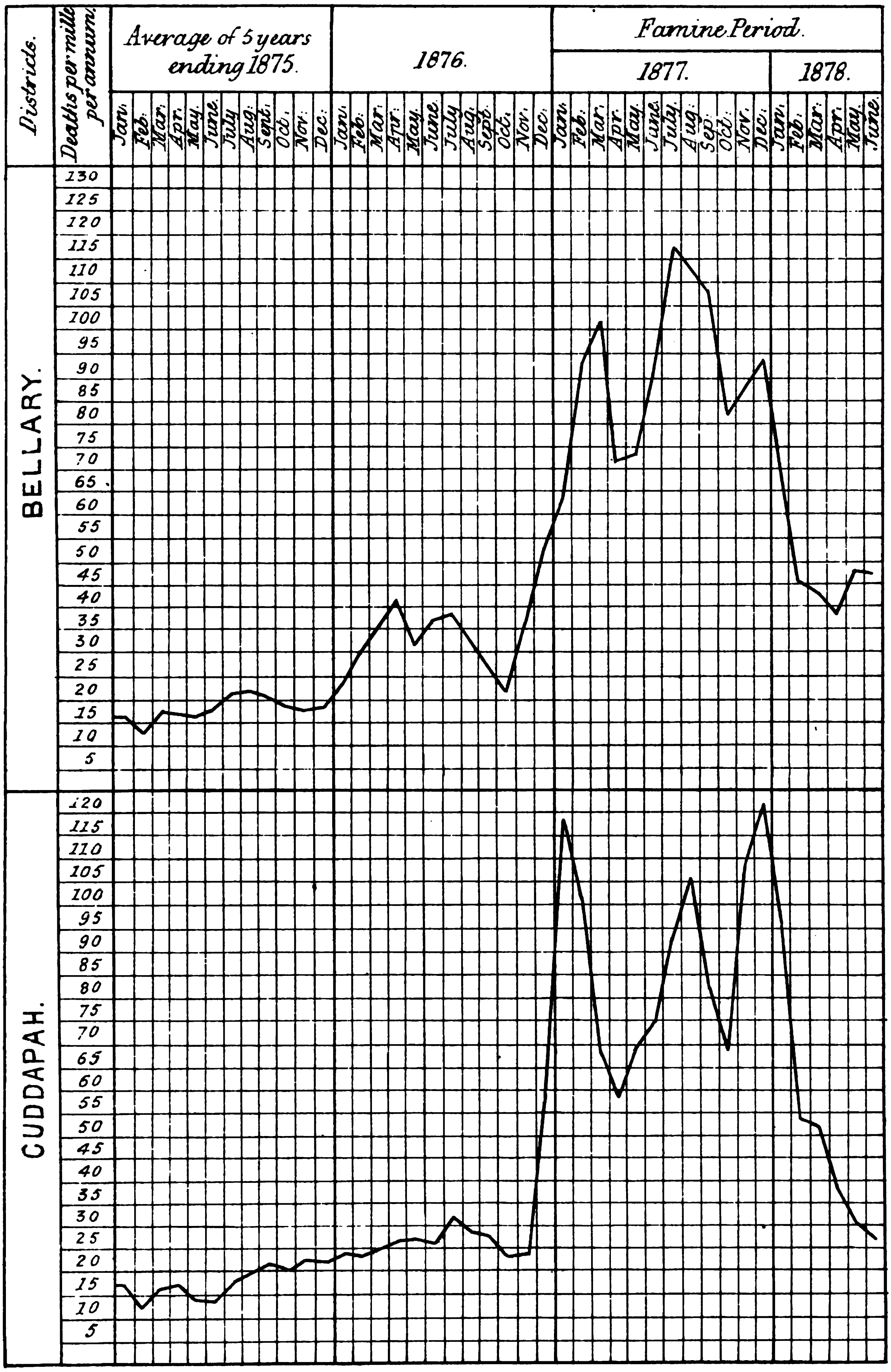
DIAGRAM showing the DEATH RATE per mille per annum in the undermentioned Districts in 1876, 1877 & 1878, compared with average of 5 previous years ending 1875.



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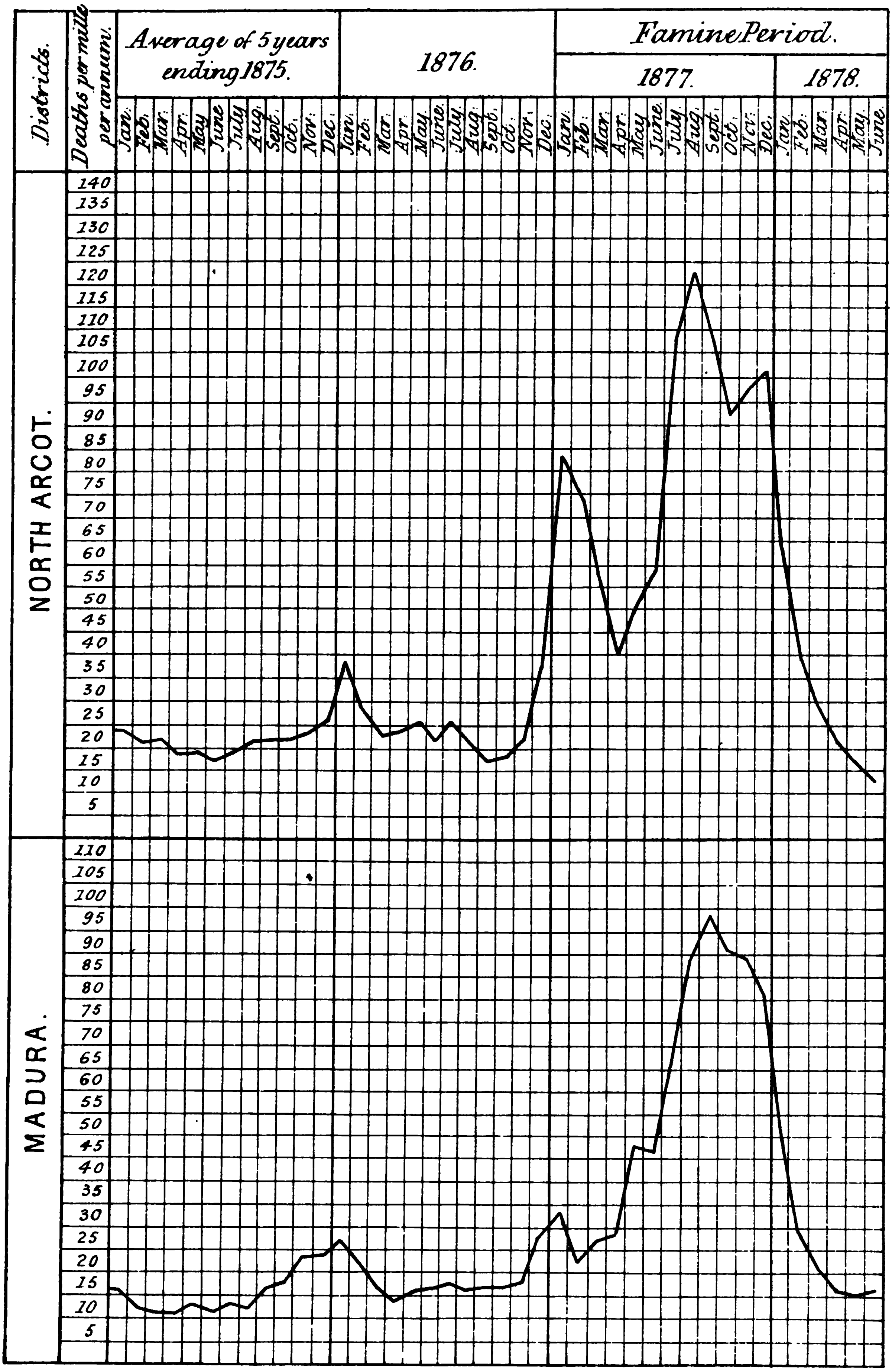

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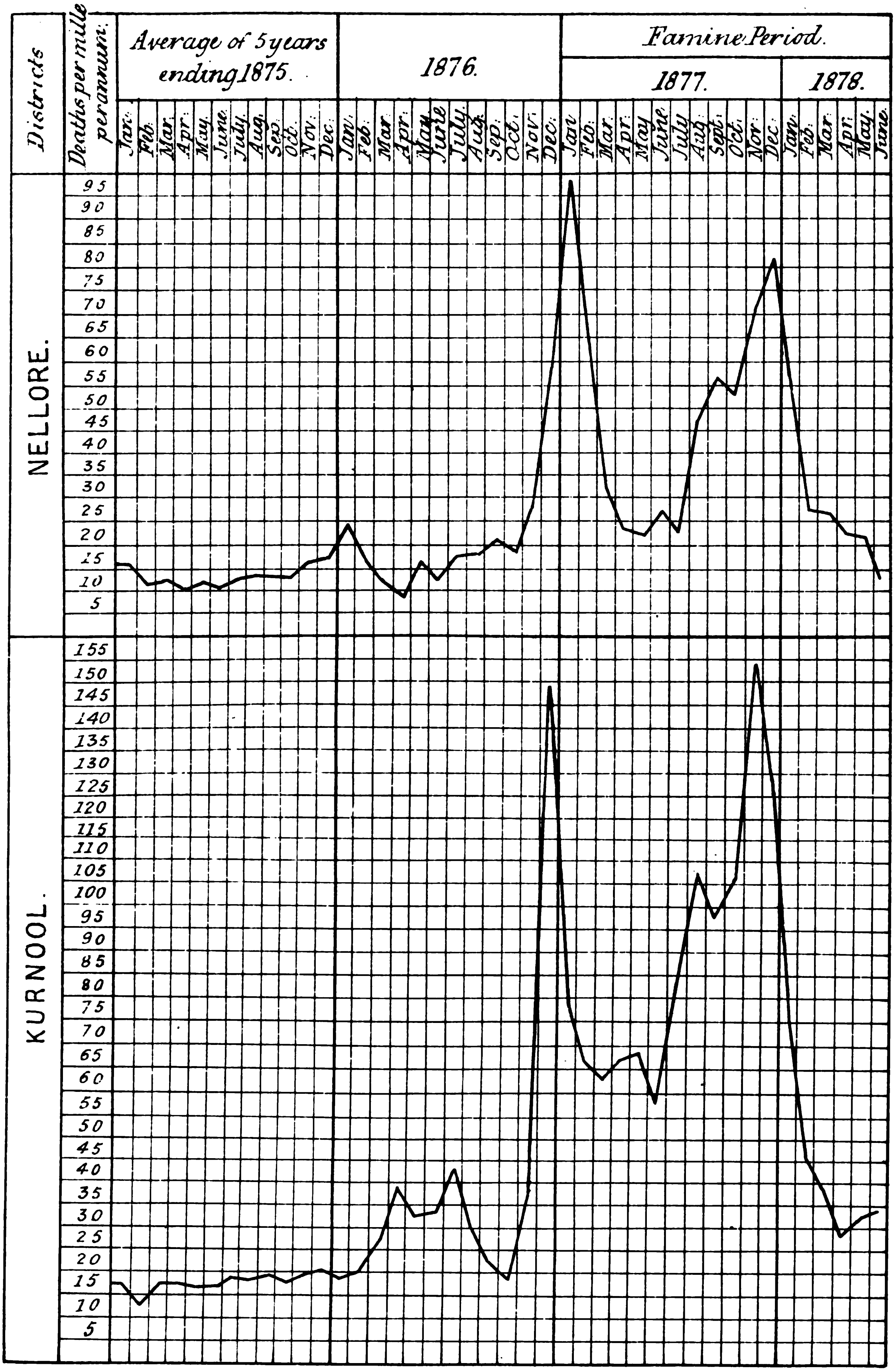

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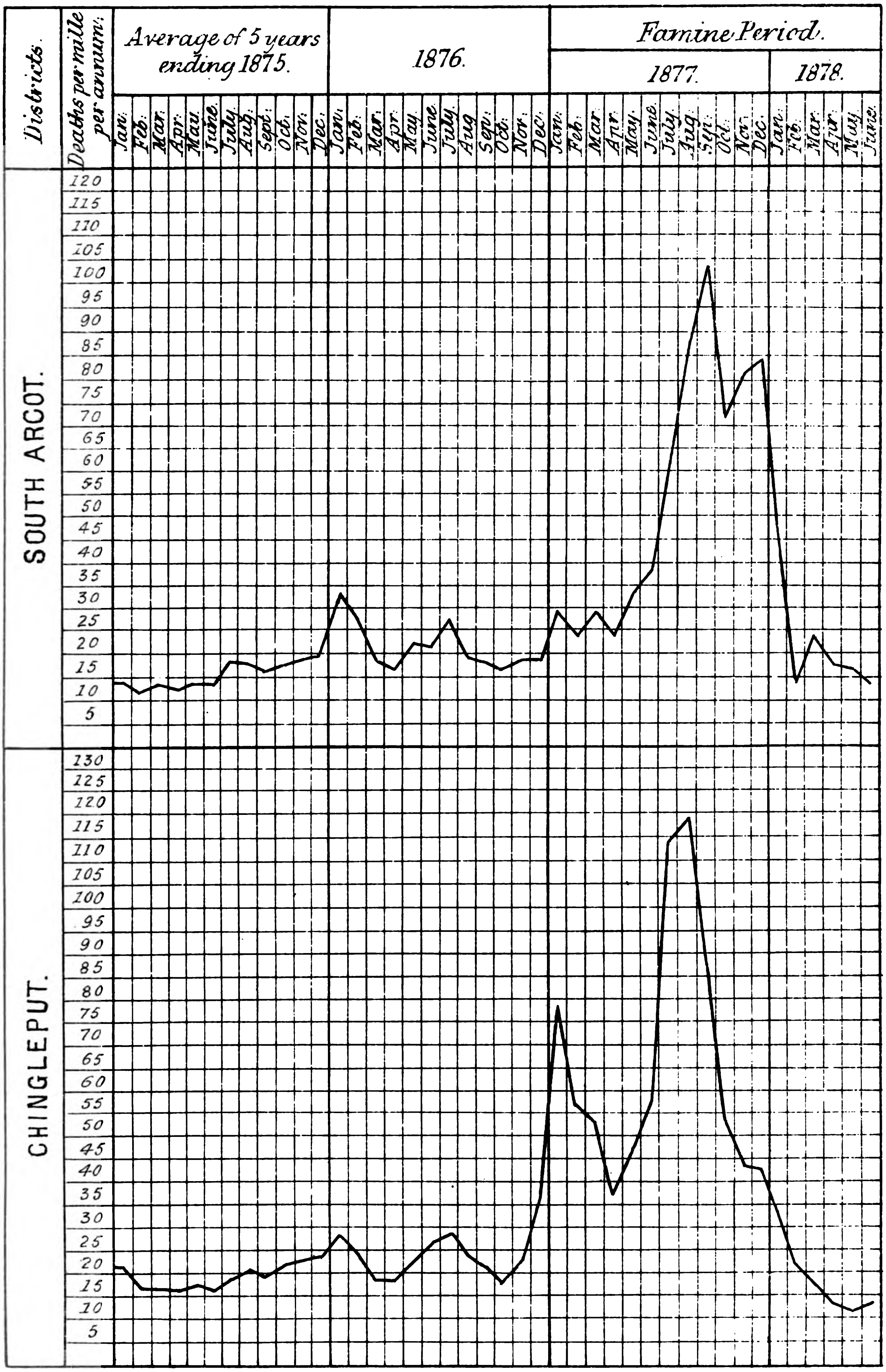

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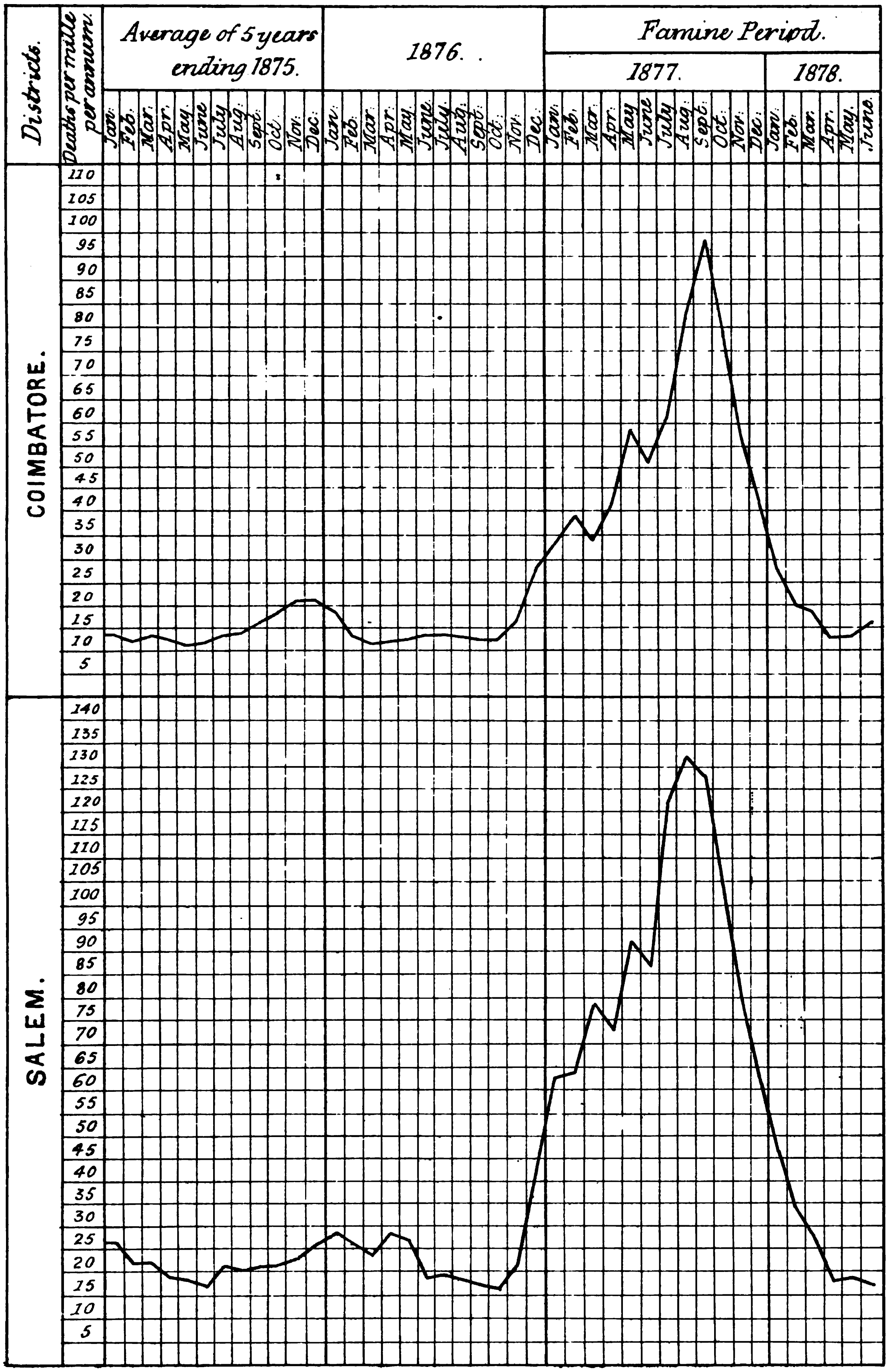

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CHAPTER IV.

GENERAL DISEASES OF FAMINE.

Indistinct line between healthy and impaired nutrition.

It will be evident from what has been already stated that in a community affected by chronic starvation the line cannot be drawn with any distinctness between health and disease. Impairment of nutrition is in itself a diseased condition, but one which, if continued but a brief time, quickly disappears. But defective nutrition prolonged day after day, week after week, and month after month, not only leaves evidence of impaired function, but eventuates in physical changes of structure of the assimilative organs that do not admit of repair or restoration to a healthy condition, and it is necessary therefore to go into some detail in regard to the more obvious results of chronic insufficiency of food.

Increased mortality from ordinary forms of disease in famine times.

But before entering on this subject, it is just as well to call attention to the fact that the ordinary causes of mortality in an Indian population, such as cholera, small-pox and fevers, are aggravated either by the depraved condition of health and lowering of vitality from bodily wasting, or by the circumstances of the food dearth bringing the people under peculiar insanitary conditions.

The Enquiry Commissioners of the Orissa famine of 1866 came to the following conclusions, and I think that the experience of the recent famine in Southern India has not tended to weaken their force in any respect.

Experience in Orissa famine.

"We think it quite impossible to distinguish between the mortality directly caused by starvation, want, and bad food. * * Want and disease run so much into one another, that no statistics and no observations would suffice to draw an accurate line."

Cholera mortality in famine.

CHOLERA.—The climatic conditions preceding a food scarcity appear, as a rule, to be favorable to the development of cholera epidemics. During the years of excessive rainfall in South India from 1871 to 1874, there was a very remarkable absence of cholera throughout the country. It is by no means intended that drought and cholera should be looked upon as cause and effect, for there is no evidence in support of such a view; but it so happens that when cholera is present in a province during a season of drought and food scarcity, its effects on population are intensified. This was the case in the famine of 1833-34, and in the scarcity of 1853-54, and in the famine of 1866, and remarkably so during the famine of 1876-77.

Causes of increased mortality from cholera in famine years.

The unnatural life of the people in famine times, and the resort to unusual kinds of food, undoubtedly tend to disorder the digestive organs; at the same time, the wandering propensities of the people, their neglect of ordinary cleanliness, the crowding of the people on relief-works and in centres of relief, or in towns where food is to be had, all tend to the aggravation of the intensity of cholera epidemics.

Deterioration in quality of water-supply.

As a consequence of drought producing food scarcity, the water for domestic use becomes scarce, and the sources of supply are liable to be fouled in every conceivable way.

The usual surface wells and tanks have dried up, and the sources that are available are so much polluted, that even persons who are particular about the quality of their water are unable to procure a wholesome supply. When the people, therefore, were accumulated by thousands on various road-works, and the wells were few and far between, it was no cause for surprise that sudden explosions of cholera occurred amongst them, nor was it to be expected, with a general deficiency and foulness of water, that the village populations would escape cholera infection.

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The intensity of cholera throughout the population was coincident with the early period of food distress, when the people began to eat unusual food, to hard together in crowds, and to use bad water. The intensity of cholera had declined before the worst period of the famine arrived, and it completely died out of a large portion of the famine area, after rain had fallen and ordinary agricultural work had been resumed.

Cholera confused with famine-diarrhœa by ignorant registrars of deaths.

During the prevalence of cholera there was a general tendency to ascribe mortality really due to privation to that cause. I have myself repeatedly seen persons dying of chronic starvation placed in cholera sheds, because they had the fatal diarrhœa that kills in famine. The Sanitary Inspectors repeatedly noticed the same thing in their weekly inspection reports, and of the 357,430 deaths registered as "cholera" during the year 1877, it is quite certain that a considerable proportion ought to have been classed differently.

Experience in Orissa.

In the Orissa famine the Enquiry Commissioners have recorded the results of similar errors of diagnosis.

"It depended," they say, "very much on the idiosyncracy of the narrator whether the mortality was ascribed to cholera or want, or to both, and as in ordinary times cholera is sometimes called by milder names, so starvation may sometimes have passed for cholera. The presence of cholera seems at any rate to have had a material effect in rendering less palpable and undeniable the whole effect of want in the early stages of the famine, but was certainly to a great degree the result of want."

To show how cholera and the bowel-complaints of famine were confused even where there was some sort of medical supervision, I may quote one or two remarks from the Sanitary Inspecting Officers' reports.

Dr. Gray, Chingleput:—

"I am afraid that the cholera statistics of this camp are not very correct, cases of irritative diarrhœa and dysentery being put down as cases of cholera. I ordered one case of dysentery to be removed to the general sheds; this case was being treated by the Dresser as one of cholera."

Dr. McNally, 25th July 1877, writes:—

"Went with Mr. Stewart 2½ miles out on Royachotti road to see some coolies supposed to have cholera. They were all cases of famine-diarrhœa, and were directed to be brought into the relief camp."

Altered type of cholera in the famine-stricken.

But there can be no question that cholera was very prone to seize on the poor who were already slowly declining from defective food, and that death was often hastened by a sudden accession of diarrhœa of a choleraic type. In those weakened by famine there were no muscular cramps, and often no suppression of urine, and rarely any vomiting. The patients sunk after passing two or three watery evacuations. The conclusions I draw from the experience of the last year are, that if cholera is epidemic in a province during famine time, it must inevitably affect in an undue degree those who are famine-stricken, but that cholera is not a necessary or universal accompaniment of famine, and that the rise, progress, and decline of cholera epidemics are in no way affected by the prevalence of famine. We saw, for instance, cholera declining steadily in almost the whole of the famine area at the very time that famine was widening its grasp, and bringing under its influence whole classes of the population who had held their own during the early months of scarcity.

Cholera in famine times an accident, not a necessary sequence of famine.

Small-pox a natural concomitant of famine.

SMALL-POX.—The conditions which bring about famine seem to be very favorable to the production of epidemics of small-pox. In every year we find the dry months most favorable to the spread of small-pox, and an epidemic generally gains its greatest intensity in the months of March and April. The continued drought of 1875, 1876, and 1877 afforded the conditions for a widespread epidemic of small-pox, which was not confined entirely to the famine districts, though the mortality within the distressed area was higher than elsewhere. It is curious to note that in every great famine small-pox has been a natural concomitant. This was the case in Guzerat in 1812, in the Guntoor famine of 1833-34, in Orissa in 1866, in Southern India in 1876-77,

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and more recently in the North-West Provinces in 1878. During the siege of Paris, when the people were put on famine rations, small-pox became exceedingly virulent and fatal.

Orissa experience in 1866.

Mr. Raban, B.C.S., the Collector of Cuttack, remarked in 1866:—

"There is no doubt that small-pox was largely propagated by the herding together of the houseless poor who roamed over the country in search of food, and that its fatal effects were aggravated by the condition of those attacked."

It must be remarked here that the poorer classes seemed to have no fear of the infection of small-pox. I have seen men covered from head to foot with small-pox pustules elbowing their way through crowds in the streets, or women and children in the same condition squatting in lines by the side of unaffected persons, and the latter making no objection to the proximity of their dangerous neighbours. In well regulated camps or relief centres this state of things was not permitted, but a good many of our camps and feeding centres in the early months of the famine were not well disciplined. The presence of small-pox in a house, moreover, seemed to be no objection to the crowding of that house with all the relatives and friends; and so prevalent was small-pox at one time in the town of Madras, that the Health Inspectors found hardly a house free of it. It must be remembered that we have no law to make vaccination compulsory, and that habitually about three-fourths of the children born escape vaccination, nor can we legally insist on the isolation of persons affected with small-pox, so that when an epidemic occurs it runs its course to a great extent unmolested. The wandering and herding of the people in crowds, their bivouacking in infected places, and their enfeebled condition of body, all tended to aggravate the intensity of the disease. At one time, when I had to do travelling in country carts, it was positively dangerous to use vehicles of this description, small-pox being so prevalent that the chances of getting an untainted cart or a driver free of small-pox scabs were very problematical. During the year 1877, 88,321 deaths from small-pox were registered in the Presidency against an average number of 29,301 in the previous eleven years.

Vaccination.

The influence of vaccination, where it could be carried out effectively, as in closed camps, was very well seen. In any well managed camp or poor-house it was quite practicable to control small-pox, and in many instances this was done most effectively by systematic vaccination of the unprotected. I have known vaccinated children kept for weeks in a small-pox shed, mixed up with persons suffering from confluent small-pox, without taking the disease (in this case an ignorant superintendent had mistaken *itch* for small-pox); and wherever vaccination was vigorously practised amongst new arrivals in camp, small-pox was kept down. During the year 1877 the vaccine operations in the Presidency were more than doubled, on account of the famine bringing the villagers to relief centres, where the children could be sought out and operated on. If vaccination was compulsory in India, the administration in famine times would have one difficulty the less to contend with. Experience shows us that small-pox will always be a complication of famine, and the complication is so much the more embarrassing from the habitual neglect of vaccination under the voluntary system.

Causes favoring the production of fevers.

FEVERS.—Lowering of sub-soil water and overheating of the soil are some of the physical effects of prolonged droughts, and these conditions, coupled with the absence of moisture, are not conducive to the exhalation of miasmata from the earth. Consequently in the early period of famine, there is, if anything, an absence of the usual amount of intermittent fever in the population. This was undoubtedly the case in the famine area of Southern India so long as the drought continued. It was the case also in Orissa in 1866, for the Commissioners report: "We have heard comparatively little of fever during our inquiry." In the Behar famine of 1874, the Secretary of State for India sent out special instructions for the investigation of the fevers usually thought to be attendant on famine, but the Sanitary Commissioner with the Government of India officially reported that there was no prevalence of fever in the famine tract. In the Rajputana famine of 1868 there was no fever until after the rains.

Absence of fever during the continuance of drought.

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No evidence of the presence of relapsing typhus in the famine-stricken.

An idea has obtained very general prevalence that the "relapsing typhus" of authorities is specially connected with famine, but there are no substantial grounds for this theory. It is true that in the Irish famine of 1846 relapsing fever was prevalent in the country when the famine began, and that the food distress caused the people to herd together in towns and food-centres just as our Indian population did, and in this way favored the epidemic spread of relapsing fever. Many of the famine-stricken fled to the large towns of England and Scotland, and carried with them the seeds of this contagious fever, which began to spread in Liverpool, Glasgow, Edinburgh, and Manchester amongst persons who had not been subjected to famine. But the presence of relapsing fever in Ireland at the time of famine was an accidental circumstance, just as cholera in Southern India, when the famine broke out, was an accident. Neither disease was caused by the famine, but the circumstances and condition of the people in either case enabled the disease to lay hold of a greater number of people than would in ordinary times have been affected.

If relapsing fever was an invariable result of famine, we should find some evidence of its existence in the varied experience of the recent famine campaign; but although special inquiries were made by myself and Sanitary Inspectors, the result was that we never met with a case of contagious fever, or fever at all resembling the relapsing typhus of the Irish famine.

When Dr. D. D. Cunningham came down to Madras in May 1877, at my request, to examine the pathology of famine diseases, we could not find a case of ordinary intermittent fever in the camps or hospitals, so rare were febrile affections at this time. In Bombay some discussion has taken place regarding the appearance of *spirilla* in the blood, in the fever cases usually classed as "remittent." (My friend and fellow-student Dr. Vandyke Carter has the credit of observing this feature of the blood in fever patients at Bombay, and has communicated his views to the Royal Medico-Chirurgical Society of Great Britain.) This appearance was at one time regarded as characteristic of "relapsing fever," but Dr. Lewis has shown that the *spirillum* may be found in non-relapsing febrile disorders, and that its presence in the blood is no proof of the fever belonging to the contagious class of diseases.

So long as the dry heat and drought continued, fevers of any description were rarely seen in the famine-stricken, but after the heavy cyclonic storm in the end of May and the general wetting of the heated soil, agues became prevalent over a wide area of country. In September and October the long-delayed rain fell in unusual quantities, and after this saturation of the soil febrile affections, always of the malarious type, either intermittent or remittent, became exceedingly prevalent, especially in those parts of the country which had been visited by famine. All classes of the people, even the European officials of the districts, felt the malarious influences. In Kurnool and Cuddapah public business nearly collapsed owing to the subordinate officials being stricken down with fever. The months of November, December and January in those districts have a high day, and low night temperature, and thousands of the half-starved survivors of the worst period of the famine fell victims to the fever. They had no strength or vital force to enable them to rally. The death-returns of the various districts show that increase of fever mortality began after the wetting of the soil, which for a long period before had been exposed to intense solar heat; and all the inquiries made in regard to the prevailing forms of fever showed them to be of the intermittent or remittent type. Dr. Sturmer of Nellore reported that in the famine-stricken the fever, after continuing in paroxysms for eight or ten days, ended in dropsy or dysentery. In the cold weather, when the mortality was highest, lung and bronchial congestions were common. The fever mortality was greater than that from cholera or small-pox, and was very heavy in November and December. As Mr. Raban noticed of diseases in the Orissa famine—

Orissa experience.

"Many ailments ordinarily trifling, became fatal at such times; the whole course and symptoms of others are changed; the fatal results of some cases is accelerated; and it is impossible to define the victims of a famine extending over many months, with the precision to be attained in a list of killed and wounded after a general engagement."

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Malarious diseases aggravated by long droughts followed by heavy rainfall.

As famines depend on long droughts, and as long droughts are often succeeded by inordinate and tempestuous rains, it is clear that in India we must always be on the look out for malarious fevers on an exaggerated scale when the normal conditions of the soil in regard to moisture are suddenly changed.

Experiences of the Rajputana famine of 1868.

After the Rajputana famine, "on the cessation of the rains, a terrible fever struck down the entire population. All the weak and sickly, the old men and half-starved children debilitated by famine were early carried off."

Fever in Tonk, 1869.

In the Native State of Tonk in 1869 one-fourth of the population perished by the famine, and half of these by the fever which followed the rains. In the Central Provinces, 1869, Mr. Morris, C.S., reports:—

Fever following famine in Central Provinces.

"The exceptional mortality of the year began just when the famine ended, and when bad and insufficient food had produced its full effect. * * But the scourge of the times was "fever," which in some localities seemed to prostrate the whole population."

Malarious fevers following on famine are just as much natural phenomena, as the enormous development of insectivorous life after prolonged drought. There has never yet been a drought of a prolonged and general character without an unusual development of locusts, grass-hoppers, &c., to prey on the early crops of the people; and where the famine history has been properly recorded, we find that an over-heated and over-dried soil, on being wetted, gives rise to miasms that tell with deadly effect on populations already enfeebled by want and privation. The total deaths registered as fever in 1877 was 469,241, or in the ratio of 16 per mille of population against 7·6 per mille in former years.

Continued fever.

Surgeon Sturmer, who travelled through the Nellore District, occasionally heard descriptions of a kind of fever which seemed to be of a continued type, but he was never able to meet with a case, although he took great pains in the village inspections to ascertain the facts.

The following is his summary in regard to the fever in Nellore:—

"Latterly fever of a malarial character and of a remittent type was extremely prevalent, and there was a large mortality from it. I made many inquiries regarding it, and gathered that the people were attacked with a fever, which lasted 10—15 days: there was an exacerbation at night; dysentery and dropsy follow, and unless recovery takes place the patient dies within a month. All were clear that there was no relapse. The victims die either delirious or comatose. This fever attacked rich and poor, Native and European: among the latter it presented mostly an *intermittent* type. The Natives used to go in for '*lunkernam*' or starvation treatment; this may partly account for the large mortality, but not altogether. It certainly was very virulent."

Impossibility of separating mortality due to disease from that caused by famine.

In the Orissa famine of 1866 an attempt was made to obtain statistics of mortality in a form containing two headings, "deaths from famine" and "deaths resulting from disease induced by famine," but, as might have been anticipated by those having any practical knowledge of famine, with no success. Mr. Raban, the Collector of Cuttack, stated that he attached no importance to the attempt at discriminating between the two classes of deaths. He says: "It is hardly too much to say that there were very few deaths last year which were not more or less connected with famine," and this experience of one practically acquainted with famine in its most awful form, will be readily accepted by all who know anything of the subject.

The use of mortality returns in famine seasons.

It is necessary to discuss the matter plainly, because a tendency has recently been growing up amongst some Indian officials to under-estimate the significance of mortality returns in famine times. The fact that a certain number of deaths figure monthly under the headings "cholera," "small-pox," and "fevers," seems to be accepted as calling for no further notice; whereas, if the returns be carefully looked at, it will be evident that these specified causes of death are two, three, or four times more numerous in a famine area than in neighboring tracts of country where famine has not prevailed, and yet I have seen explanations of the great mortality in famine districts, which have ignored the association of epidemic pestilences with famine.*

* See telegram, dated 16th October, Famine Blue Book, Part IV, pages 260, 261.

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The mortality from cholera, small-pox, and fevers has been disposed of as something quite apart from, and uninfluenced by food-dearth. Explanations of this nature, I need not observe, are made by those who have no practical knowledge of the realities of famine diseases. Famine officers who have had experience of the truth, know but too well that, as Mr. Raban so clearly puts it,—

"There are many cases of disease which are so modified by the want of proper food, clothes, and comforts, that it would be impossible to separate the effects of specific disease from those of famine."

But this truth has yet to be appreciated to the extent it deserves.

The aggregate death-rate of a population the test of normal or abnormal health.

The great test of the normal or abnormal health of a population is the aggregate death-rate. Registration of the causes of mortality in India is too rough and imperfect at present to give more than general indications; but when the death registers show that the people are dying in the proportion of 3 or 400 per cent. above the usual average in a famine area, and that no excess of mortality is occurring outside the famine districts, it would be as untrue, as it would be unphilosophical, to say that the famine was not answerable for the mortality. This is a subject at any rate on which the opinion of the medical profession in India can be given clearly and distinctly, so that no Government in future shall be misled by wrong classification of the causes of death. The death of an individual is a fact, and however we may question the accuracy of the assigned cause of mortality, the death itself cannot be explained away. In the Madras Presidency in 1877 the registered death-rate of the famine area was three times as much as that of the non-distressed districts, and no sophistry can alter the figures. Cholera, small-pox and fevers prevailed in famine and non-famine districts, but deaths were enormously enhanced only in the famine tract, even as regards these specified causes of death.

Importance of death-registration.

This is the first Indian famine in which mortuary registration has played a prominent part. In Orissa there was no death-registration, nor had the system of registration been brought into general use in Bengal in 1874, so that the effects of the food scarcity on mortality in the Behar province were never noted. At an early period of the famine, February and March 1877, I deemed it my duty to call attention to the significance of the death-rates in the famine area, and I felt this to be the more necessary inasmuch as the official delegate of the Government of India, the Honorable Sir Richard Temple, in all his voluminous minutes on the famine in Madras and Bombay, never once gave any reason to suppose that the people were dying in unusual numbers. I have held by the great truth that no food scarcity, causing wasting and emaciation of the people, can occur without great mortality, and although the death-registration has never shown the absolute mortality in any one month, the indications of the registration throughout the famine period have been sufficiently clear as to the fatality of the disaster.

Forecast of probable results of the famine made for birth and death-registration.

On the 8th May 1877, in my last contribution to the discussion in regard to the sufficiency of the scale of wages calculated on 1 lb. of grain as the daily food of an adult, I stated as follows to Government :—

"I suppose no one has been able to frame anything like an estimate of the effects of famine on the population; but making due allowances for defective registration of mortality and for the inevitable mortality that must outlast the dearth of food, I have grounds for supposing that the population of the affected districts will be reduced in eighteen months time by one-fifth or one-sixth of the numbers living before the scarcity began. This, of course, is an estimate only, based on the current birth and death-rates, and the generally enfeebled condition of the working classes in the affected districts."

If the significance of the birth and death-rates of the famine area were never properly appreciated, it was from no want of plain speaking on my part, as month after month I directed attention to the subject in special reports. There was this excuse for objecting to the evidence of the death-rates, that mortality returns had never before been used to illustrate the effects of famine, and the system of registration was admittedly imperfect, and very unfortunately as I think, a suggestion found favor that the epidemic diseases so prevalent during the famine period were something apart from, and unconnected with the famine. Whatever the explanation might be, there can be no doubt that the evidence of the mortality returns was

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regarded with some degree of scepticism; and to clear up all doubts on the point the Government of India directed that a census of selected areas in the famine districts should be taken at the end of the famine, with the view of estimating the losses of population. This famine census in the Madras Presidency has proved most convincingly that my estimate in May 1877, based on the birth and death-returns and actual observation of the condition of the people, was somewhat too low. Instead of one-sixth to one-fifth, I should have been nearer the truth if I had said that from 20 to 25 per cent. of the population of affected areas would be missing at the close of the famine.*

Results of the census of selected areas in famine districts.

The system of birth and death-registration which had been introduced some years previously, imperfectly as it had been carried out, enabled me, in conjunction with personal investigation of the actual condition of the people, to make a very fair forecast of the extent of the disaster, and there can be no question that in future we must take the death registers as an index of the degree in which food scarcity is pressing on the people. If in certain areas and provinces these registers are habitually filled up in a perfunctory manner, the facts of the late famine must be taken as a strong argument for insisting on reformation and improvement in registration.

Reports in the daily papers, and official returns of deaths in the North-West Provinces, show how terribly the food scarcity in that part of the country late in 1877 and early in 1878 has affected the death-rate. Fortunately epidemic cholera has not so far prevailed in that part of India to add to the misery of the people, but small-pox and bowel diseases have been unusually prevalent and fatal, and the aggregate registered death-rate during the period of famine has been nearly three times more than the average of corresponding months.

* In the Salem District the population had been reduced 20·7 per cent. on the census figures of 1871. In six selected taluqs of other famine districts the average decrease was 15 per cent. But these proportions take no account of normal increase of population from 1871 to 1876, which, judging from previous experience, could not have been less than 5 per cent. in five years. If we assume that the censused area represented a fair average of the larger famine tract not censused, the total loss of population in the Madras Presidency has been more than three millions. The data for this conclusion are given in a separate paper on "The influence of Famine on growth of Population," communicated to the Statistical Society. The registered mortality in certain typical famine districts is illustrated by diagrams, and these, together with the diagrams showing diminished births, are, deserving of careful study, in connection with the history of the famine.

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CHAPTER V.

SPECIAL DISEASES OF FAMINE.

DIARRHŒA AND DYSENTERY.—Of all the diseases peculiar to famine, an intractable diarrhœa, of partially digested food and watery mucus, complicated in some instances with dysentery and symptoms of ulceration of the lower bowel, was the most common. In the early period of the famine (January and February 1877), when wanderers flocked into the Madras camps by thousands, I noticed from the condition of the latrines that scarcely a man, woman, or child who had come in for relief had a healthy evacuation of the bowels. The stools were bulky, semi-fluid, deficient in bile-coloring, and consisting largely of undigested rice. But the diarrhœa of famine, of which I am now attempting a description, appears to be merely a stage in the long process of degeneration and wasting, which occurs in the famine-stricken, following on anæmia, wasting, and scorbutic cachexia. It begins very gradually, generally without pain or uneasiness, unless it be complicated with inflammatory dysentery, and not until a certain degree of body wasting has been attained is attention attracted to the looseness of the bowels. The motions are passed usually after food, and the bulk of the food is evidently but imperfectly digested and assimilated. As the disease advances there is generally evidence of breach of surface of the mucous membrane of the large intestine. The stools become more full of mucus mixed with blood, or with blood that has undergone change to a bright green tint, and with which the stools are now streaked. In the old and young the bodies are worn away to skin and bone. All the tissues that can readily be consumed have disappeared. The sick lie in extreme weakness, curled up like a ball, the thighs drawn up against the abdomen, the head bending forward on the chest, and the arms folded close against the body. The surface of the body is generally below the normal temperature, the pulse feeble, the sensibility to external impressions impaired. As the disease progresses the desire for food disappears, the stools dribble away without consciousness on the part of the patient, and death by asthenia soon closes the scene.

Famine diarrhœa.

The attitude of the sufferers from famine diarrhœa and dysentery is most characteristic, and can never be mistaken. The flexure of the body, relaxing the abdominal walls, I suppose gives ease to the dull aching of the intestinal region, but I cannot help thinking that the curled position above referred to is partly an instinctive endeavor to maintain animal heat. The limbs are flexed and brought close in contact with the trunk, and the patients will lie for hours and days in this posture, curled up in their blankets, taking food and medicine when given them, but apparently very indifferent as to their fate.

The end of such cases is sometimes complicated with acute dysentery—very frequently with general anasarca—and in certain seasons of the year with pneumonia.

It would seem clear from Dr. D. D. Cunningham's observations that the local origin of this fatal bowel affection is a degenerative wasting of the complex structure of the intestinal mucous membrane. At an early period of the famine I requested the Sanitary Commissioner with the Government of India to depute one of his scientific assistants to study in our famine hospitals the minute changes of structure in famine diseases, and he obligingly sent down Dr. D. D. Cunningham, whose detailed report on the minute pathology of famine diseases has not yet appeared, but will, I trust, add something to our knowledge of this fatal affection.

Pathology of famine diarrhœa.

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Meanwhile I agree with Dr. D. D. Cunningham's explanation of the nature of the changes that take place in the bowel, and my experience entirely corroborates the fact that when these changes have occurred recovery is almost hopeless.

Dr. Cunningham says:—

Dr. D. D. Cunningham's views.

"The pathological changes essentially characteristic of famine-diarrhœa and dysentery, consist in a softening and subsequent atrophy of the mucous membrane of the intestinal canal, due apparently to a process of fatty degeneration of the tissues, and leading to the destruction of the apparatus provided for the absorption of nutritive material. That such a process is sufficient to account for the phenomenon of the disease observed during life is manifest. The disintegration of the intestinal mucous membrane fully accounts for the disordered state of the alimentary functions. The pathological appearances also account for the failure of curative measures, improved diet, medicines, &c., in the treatment of the disease. When once the complex structures of the intestinal mucous membrane have been so seriously affected by degenerative changes dependent on insufficient nourishment, they cannot be renewed, and no diet, however careful and generous it may be, can be of any avail when once the means by which alone it can be appropriated to the necessities of the body have been destroyed." (Report dated 18th June 1877.)

Dr. A. Porter's pathological notes.

Dr. A. Porter's pathological investigations come in here to help us in understanding the general changes of structure that take place. The *stomach* in its mucous coat was smooth, thin and pale in 46·5 per cent. of males and 53·2 per cent. of females, pale rose-colored in some instances. The mucous membrane of the *jejunum* was very seldom found of a healthy appearance, being rose-colored, or congested in the majority, and in some the whole of the mucous membrane and in others only the *valvulæ conniventes* were milk-white. In some there was œdema of the mucous membrane, and sub-mucous ecchymosis in 7 or 8 per cent.

The *ileum* was generally pale and thin, but in some instances rose-colored, and in 17 per cent. of the autopsies apparently healthy in structure. The congestion was mostly at the lower end. In some there was œdema of the mucous membrane, and in a few instances a film of effused lymph often confined to, and always best marked in the lower part of the gut. Ulceration was present in about 8 per cent.

Peyer's patches were generally prominent and glands full of a clear fluid.

The *large intestine*, as in fact all the intestinal canal, was generally *empty*. In six cases of Dr. Porter's *post-mortem* examinations it contained formed fæces, feculent pult in 24 cases, and scybalæ in 14 cases. The mucous membrane was healthy to appearance in only 11·8 per cent. of males and 5·9 per cent. of females. The diseased appearances varied from simple congestion to œdema, ulceration, effusion of lymph, and extensive sloughing. This latter condition was present in 15 per cent. of the cases examined. Dr. Porter's report being printed *in extenso*, there is no necessity for quoting it in detail here.

Treatment of famine-diarrhœa.

TREATMENT OF FAMINE DIARRHŒA.—Nothing could be more disheartening to the medical staff engaged in famine work than the treatment of diarrhœa or dysentery. If symptoms of inflammatory dysentery were present, they could in some instances be subdued by ipecacuanha and opium; but the painless wasting diarrhœa was a most intractable malady, no matter how carefully the diet and treatment were conducted. In certain cases where the degenerative changes of the assimilating structures had not proceeded too far, nutritious diet, milk, soups, &c., in a liquid form, with opium, astringents, nux vomica, and tonics seemed to be useful if not in restoring tone, in preventing further wasting, but even in many of the cases where the diarrhœa ceased, symptoms of dropsy supervened and ultimately destroyed the patients.

Great prevalence of the malady, and inadequate medical aid and nursing.

The treatment of some hundreds of cases in every stage of faminediarrhœa and dysentery often devolved on a single Hospital Assistant, and in many instances there was no medical aid of any description for our famine-relief centres.

The general hopelessness of the cases produced, I am afraid, but too often on our Native medical brethren a feeling that nothing could be done to remedy the disease, or to save life, and probably in many instances the efforts made to battle with the disease were but feeble; but although this was the case in some camps coming under my notice, I am bound to say that in other instances the

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Native medical men exerted themselves with a will to bring about order, discipline, cleanliness, and good nursing in their hospitals, and that they did their best to cope with the overpowering amount of disease around them. The Indian Governments train and employ medical men for duties connected with the Army or Civil administration, but have usually no surplus numbers to draw upon for withstanding any affliction of the general community, and the demands for aid during the famine were so constant and pressing, that if we had had four times the number of trained men, employment could have been found for them.

Assistance was afforded by the Bengal and North-West Governments, but with all the aid obtainable, many thousands of the people perished without any medical aid.

There was even a great difficulty in getting them to resort to thehospitals. So long as a man could move about and eat his food in the camp or poor-house he would seldom complain, and when the camps were first established many were found dead in the sleeping huts every morning, but by regularly visiting the sleeping huts in the day-time, and at night, the weakly ones were gradually picked out and brought under medical supervision.

Mortality from famine-diarrhœa.

In what proportion did this fatal bowel-disease afflict the famine-stricken?

I regret that I have not accurate statistical data in regard to this subject, but in regard to the pathological condition of the famine-stricken there is the evidence of Dr. A. Porter, who found healthy structure of the intestines in only 11·8 per cent. of males and 5·9 per cent. of females. This, at any rate, is conclusive evidence as to the frequency of disordered bowels in the fatal cases, and I have already stated that my own observation, founded on inspection of open latrines, was that at one time healthy evacuations from the bowels were the exception.

Dr. McNally, of Cuddapah, gives in his weekly diaries the mortality statistics of certain camps coming under his sanitary supervision.

Thus in Royachoty the mortality up to 30th June was—

From diarrhœa or dysentery	484
Small-pox	11
Cholera	8
Total ...	503

In Peelair (up to 29th July)—

Diarrhœa or dysentery	385
Dropsy	85
Small-pox	16
Fever	29
Total ...	515

Madanapalli.—In this camp 989 deaths occurred among 4,432 people in 3½ months; all the deaths were attributed to diarrhœa, dysentery and dropsy, except 14 from small-pox.

At Pullampet, up to 27th July, the deaths were—

Diarrhœa	101
Dropsy, debility and anæmia	5
Total ...	106

During the worst period of the famine, and before rain fell in quantity sufficient to cause malarious exhalations from the soil, I believe I am within the mark in ascribing three-fourths of the mortality of the famine-stricken to diarrhœa or dysentery. This was certainly the case in camps, and the remaining one-fourth would be due to dropsy, debility and anæmia, or cases in which the bowel affection was not prominent. Later on in the year febrile diseases and lung complications were complicated with the bowel affection, and these diseases often cut short the natural progress of the essential famine disease.

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In one of his weekly diaries Surgeon Lancaster notices a peculiar symptom of famine-diarrhœa which I have omitted to bring into prominence.

He says (28th July):—

"In the camp, diarrhœa is very common amongst the children. It is, I believe, some form of famine-diarrhœa. I have been struck with the character of the stools, and I should very much like to have your opinion about it. The stools are loose, and consist chiefly of mucus, which is perfectly *green*; there is a still more watery part which is also deeply tinged with green; the color is so well marked that it stains cloth deeply, and may be seen staining the ground. Is this due to excessive secretion of bile? *It is fearfully fatal*; when I see it I always think the case hopeless. I should be glad to know if you have seen similar cases in other districts."

The following was my comment:—

"The green color is due, I think, to altered *blood*. It betokens ulceration of the bowel, and I have never seen it except in cases of extensive ulceration of the lower bowel. It is generally a fatal sign."

I may state that this peculiarity of the stools in dysentery from privation attracted my notice more than 20 years ago in the Coimbatore Jail, and the grave character of the symptom was then recognised; and in every part of the country visited by famine during the last year, the symptom was always found to precede dissolution. It is not invariably present in each stool, sometimes the green tint disappears for days and returns again. The presence of so large a proportion of these bowel disorders in camps and hospitals added much to the difficulty of keeping the people clean. A peculiar cadaveric odor hung about patients in this condition. Death of the bowel in fact had taken place before life was extinguished. When many of such patients were grouped in huts, the death odor was very marked, and very offensive to those whose duty led them to be amongst the sick.

Dropsy.

DROPSY.—Next to diarrhœa and dysentery the most common condition of the famine-stricken in hospitals was that of dropsy. From the infant in arms to the old man tottering to the grave anasarca was common. The most common beginning of this symptom was œdema about the feet and ankles, and of the face and eyelids. In some there was fluid in the peritoneal cavity, and in others all parts of the body were anasarcous. Dropsy often supervened on diarrhœa, or, if the bowel disorder had temporarily ceased, the surface of the body began to fill with fluid. No doubt the lymphatic system shared in the general wasting and disintegration of the other tissues, and the healthy balance between absorption and exudation was lost. In the early months of the famine, diarrhœa was most frequent and dropsies comparatively rare; but later in the year the proportion of dropsical cases increased. Intermittent and remittent fevers were in the latter part of the year often followed by fatal dropsy. Out of 372 *post-mortem* examinations of persons dying in the famine wards of the Royapettah Hospital, only 24 were anasarcous, but in many camps dropsies were exceedingly common from August until the end of the year.

Treatment.—The ordinary diuretics, sudorifics and tonics appeared to exercise very little effect in increasing the action of the absorbents; but in the Monegar Choultry Camp, Dr. Thompson found a mixture of cod-liver oil and balsam of copaiba to exercise a most favorable influence in relieving the dropsical symptoms. If there was no destructive ulceration of the bowel, the cases thus treated did very well.

Inunction of oil in the dropsy of emaciated subjects.

At my suggestion some of the younger children who had extreme wasting followed by dropsy were treated by inunction of cocoanut oil over the whole surface of the body. In these cases there was defective assimilation of food, great debility and low temperature, and it seemed only reasonable that if the skin could be got to take up fatty matter there would be less loss of animal heat and wasting of tissue. In regard to the cases thus treated it was the opinion of Dr. Thompson, the Hospital Assistants and myself, that life was often prolonged and the downhill progress arrested, though in some the unhealthy condition of skin appeared to prevent absorption. In all these cases the inunction was grateful to the little patients; it kept the skin soft and free of irritation where it did no other good. As an aid in the preservation of life, where tissue wasting cannot be arrested by food, I think

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the oil inunction is deserving of further trial. I have no statistical evidence on the subject, and, as far as I know, no notes were kept of the results by the Hospital Assistants.

Worms in the intestines.

INTESTINAL PARASITES.—The round worm (*Ascaris lumbricoides*) is very common in Southern India, and more so I think in the districts bordering on the coast than in the interior. During the famine these parasites were abundantly prevalent both in adults and children. In Dr. Porter's examination of adult bodies lumbrici were found in the *stomach* of 18 males (8 per cent.) and in 19 females (12·5 per cent.), in the small intestines in 100 males (45·4 per cent.) and 86 females (56·5 per cent.); in the large intestine thread worms were found in the cæcum in one male and two females, and lumbrici from the small intestine in several cases.

In famine times the consumption of *salt* is seriously diminished. The people who have no money to buy grain, are not able to procure enough of salt to preserve their secretions in a healthy state, and in such cases intestinal parasites increase and multiply. In cases where an attempt had been made to exist on roots, leaves, and jungle fruits, there would also be a deficiency of salt in the diet, and the nature of the food used in famine times would undoubtedly favor the presence of worms in the intestines.

Ulcers.

ULCERS.—Unhealthy ulceration of the legs was common in famine camps and hospitals, and occasionally phagedenic sloughing was seen. In some of our overcrowded jails the iron fetters of the prisoners caused skin abrasion, and these cases often took on hospital gangrene. In the town of Madras a rather uncommon form of sloughing was seen. During the great traffic in grain, the carts laden with grain bags were dragged from the beach to the railway station by hand labor, and the naked heels of the coolies often got caught by the cart wheels. This form of injury generally produced sloughing and constitutional disturbance, often followed by tetanus.

Ulceration of cornea.

ULCERATION OF THE CORNEA.—This affection, which is usually regarded as a common result of famine, was not, according to my own experience, very commonly met with. Surgeon Lancaster, of the North Arcot District, saw a good many cases, but the other members of the Inspecting Sanitary staff did not often meet with it. I saw very few cases of it myself.

Itch.

SKIN DISEASES.—Itch was, as might be expected from the herding together of the people, exceedingly common and difficult to eradicate from camps. Frequently special itch wards had to be organized, and special measures of sanitation adopted to get rid of the disease. This was the more difficult, inasmuch as the new people coming in by fifties and hundreds every day, nearly all had itch upon them, and isolation during the curative process was often impracticable.

Vermin.

VERMIN in the head and body were unusually prevalent. Shaving the hair off, and subsequent cleanliness were the only effectual means of dealing with this nuisance.

Guinea-worm.

GUINEA-WORM.—This disease was more connected with the condition of the water-supply than an actual concomitant of famine. In the districts the soil of which holds the germs of guinea-worm I have never known the disease so prevalent as in March, April, and May 1877. In the Bellary and Cuddapah Districts, in inspecting gangs of coolies on works, I have seen in some gangs at the least 50 per cent. of them with the feet or legs bandaged on account of guinea-worm. Frequently the people would be disabled from working owing to phlegmonous inflammation and suppuration in the tract of the worm, and in many cases they performed their daily tasks in pain and with difficulty. The distribution of guinea-worm in India is entirely a matter of geological conformation. In some of our districts it abounds, in others it is never seen, except where people come from districts where it is indigenous.

OOTACAMUND,
1st July 1878.

W. R. CORNISH, F.R.C.S.,
Sanitary Commissioner for Madras.

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PATHOLOGY IN FAMINE DISEASES.

(*By* Surgeon-Major A. PORTER, M.D.)

AMONG the famine-stricken who died in the Royapetta Hospital sheds up to 31st March 1878 autopsies had been made on 450, comprising 220 males, 152 females, and 78 children.

ADULTS.

Classes.

Only the adults are included this report, and these may be divided, as shewn below, into the emaciated, who chiefly died from famine diarrhœa and chronic lung affections; the plump, who died from acute disease (cholera, pneumonia or accident); and the anasarcous, who generally died from diarrhœa or lung complications.

	Males.	Females.
Emaciated	181	121
Plump	28	18
Anasarcous	11	13
Total ...	220	152

Age.

Many of these patients were old and decrepit, and the majority were considerably above middle age. No native, of course, knows his own age; but taking the average of the age guessed in each case, we found the average age for the males to be 41 years with extremes of 18 and 70 years, and the average age for the females to be 44 years with extremes of 15 years and 65 years.

State of body.

The state of the body as to rigor mortis varied greatly without apparent cause. In some cases this hardly appeared at all, and in others it had disappeared in two or three hours after death, while in many it was well marked and remained on for several hours.

The skin was usually covered with scurf, but free from skin disease, except itch perhaps. Bed sores were not common, and ulceration of the cornea was observed in only two or three cases altogether. Œdema of the feet and ankles was usual, but effusion into the muscles of the calf, or other signs of scurvy were invariably absent.

Height and weight.

The majority of the bodies were mere skeletons with legs tucked up on the abdomen, the walls of which almost touched the spine. Coming under this head are 181 males, averaging in height 5·4 feet (extremes 4·58 feet and 5·92 feet) and in weight 77·1 lb. Avoirdupois (extremes 54 lb. and 113 lb.); and 121 females, averaging in height 5·01 feet (extremes 4·58 feet and 5·66 feet) and in weight 61·4 lb. (extremes 40 lb. and 102 lb.)

There were 28 plump males, of an average height of 5·4 feet and weight of 100·11 lb.; and 18 plump females, of an average height of 5 feet and weight of 85·36 lb.

Of anasarcous subjects, 11 were males of an average height of 5·3 feet and weight of 101·3 lb.; and 13 were females of an average height of 5·1 feet and weight of 83·2 lb. Taking the whole of the adults, the average height of the 220 males is 5·4 feet and average weight 81·4 lb., the extremes in height being 4 feet 7 inches and 5 feet 11 inches, and in weight being 54 and 167 lb.; and the average height of the 152 females is 5·0 feet and average weight 66·2 lb., the extremes in height being 4 feet 7 inches and 5 feet 8 inches, and in weight being 40 lb. and 127 lb.

SKULL AND CONTENTS.

Scalp and Calvarium.

Anæmic.

In 103 males, 46·8 per cent., and 86 females, 50·6 per cent., the scalp was thin and pale, and on removing the calvarium no blood appeared on the meninges as is usual when the sinuses are full; in 19 males, 8·6 per cent., and 3 females, 2 per cent., these structures presented about their normal appearance; and in 1 male and 1 female the scalp was pale while the meninges were bloody; and in 5 males and 6 females the meninges were pale while the scalp was bloody.

Hyperæmia.

In 86 males, 39·1 per cent., and 52 females, 34·2 per cent., a considerable amount of blood flowed from the severed vessels on cutting through the scalp, and from the surface of the meninges and base of the skull on removing

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the calvarium; in 10 males, 4·5 per cent., and in 3 females, 2 per cent., the blood was in large quantity. In 4 males and 2 females the calvarium was eroded on its surface, difficult to separate from the meninges—requiring a knife in some cases—and thickened with deepening of the arterial grooves.

Corrosion.

On cutting through the meninges serum was found in the cavity of the arachnoid in 175 males, 79·5 per cent., and in 117 females, 77 per cent., and blood usually with bloody fluid was found in 2 males and 2 females, leaving only 43 males, 19·5 per cent., and 33 females, 21·7 per cent., with this cavity quite free from effusion.

Meninges. *Serum.* *Blood.*

The quantity effused amounted to four to six ounces in 46 females, 30·2 per cent., and in 38 males, 17·2 per cent.; of these the serum was bloody in 1 female and in 4 males, in the rest it was pale straw-colored; it amounted to about a fourth of this quantity in 64 males, 29 per cent., and in 30 females, 19·7 per cent.; of these the serum was bloody in 1 male and 2 females and straw-colored in the remainder; and the quantity was small, being confined to the base of the brain, and not appearing till the tentorium had been cut through in 73 males, 33·2 per cent., and in 41 females, 27 per cent.; the serum was straw-colored in all, except 1 of the males, in which it was bloody.

Quantity. *Color.*

In 159 males, 72·27 per cent., and in 106 females, 70 per cent., there was an effusion of serum beneath the arachnoid, filling up the sulci of the brain, most marked on the vertex, less towards the base; this consisted of colorless or very pale straw-colored serum in all except 2 males and 1 female, in which it was bloody.

Sub-arachnoid. *Serum.*

There was a large quantity of blood effused in 1 male, a case of fracture of the skull, and 1 female, a case of cerebral apoplexy; and in 23 males, 10·4 per cent., and 15 females, 10 per cent., there was slight effusion of blood generally appearing along the course of the veins as dusky red blotches of sub-arachnoid ecchymosis, and usually situated opposite the temples or on the corona of the hemispheres, and on dissection found not to extend into the sulci or to form clots, except in the cases of 3 males and 3 females; of these, in 1 male the ecchymosis extended into the sulci along the longitudinal fissure, in 1 it extended into sulci on left and was less on right hemisphere, and in the third a small clot near the tip of anterior cornu of left hemisphere; and in 1 female a thin clot extended from the choroid plexus over the back of the corpus callosum; in 1 there was a firm clot the size of No. 1 shot in the pia mater lying on the corpus callosum and not connected with any large veins, and in the third there was a small soft clot in the sulci on the anterior part of right hemisphere.

Ecchymosis.

The larger vessels of the pia mater were found to be full in 88 males, 40 per cent., and 37 females, 24·3 per cent.; in two of the latter they were distended; they were half full in 11 males, 5 per cent., and only the lateral vessels were full in 13 males, 6 per cent., and 24 females, 15·8 per cent.

Pia mater. *Large vessels.*

There was injection of the capillaries to pink or deep red in 5 males and 2 females; of these in 2 males and 1 female there was also engorgement of the larger vessels with some serous effusion, and in 2 males there was serous effusion with the larger vessels empty; in 1 male the dura mater was injected, dry and lustreless on its inner surface, while the larger vessels of the pia mater were empty, the capillaries being injected; and in 1 female the arachnoid was dry, the pia mater being injected red, with livid mottling extending from the vessels of the sulci.

Capillaries.

In 11 males, 5 per cent., and 13 females, 8·5 per cent., the pia mater was opaque, appearing as a white film over the brain; in 2 males and 1 female the surface of the brain looked whitish from a sub-arachnoid serous effusion soddening the membrane. In 4 males and 4 females the usual opacity along the longitudinal fissure extended outwards two inches or so beyond its usual limits. The adhesions between the parietal and visceral arachnoid, and of the latter across the fissure, were greater than usual in 5 males and 3 females; in one of these cases a dropsical ventricle was opened from this cause in removing the brain.

White colored.

The weight of the brain was found to average in the 220 males 41·544 oz., with a ratio to average body-weight of 1 to 31, the extremes being 54 oz., with a ratio to body-weight of 1 to 20·74 in an emaciated religious mendicant of the Reddy caste, and 32 oz., with a ratio to body-weight of 1 to 44 in an emaciated punkah cooly, also of the Reddy caste; and in the 152 females 37·5 oz., with a ratio to average body-weight of 1 to 28·2, the extremes being 49·25 oz., with a ratio to body-weight of 1 to 19·82 in a much emaciated cooly of the Pariah caste, and 27·75 oz., with a ratio to body-weight of 1 to 37·4 in an emaciated woman of the Wudder caste.

BRAIN. Weight.

The average weight of the brain in the 181 emaciated males is 41·423 oz., with a ratio of their average body-weight of 1 to 30·5, and in the 121 emaciated females 37·295 oz., with a ratio to their average body-weight of 1 to

Emaciated.

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26·3; in the 28 plump males the brain weight averages 41·83 oz., with a ratio to their average body-weight of 1 to 38·2, and in the 18 plump females 38·1 oz., with a ratio to their average body-weight of 1 to 35·8; and in the 11 anasarcous males the average weight of the brain is 42·82 oz., with a ratio to their average body-weight of 1 to 37·7, and in the 13 anasarcous females 38·567 oz., with a ratio to their average body-weight of 1 to 34·5.

Plump.

Anasarcous.

Inference.

From the above results it would appear that the brain wastes in starvation like other tissues of the body, but in a less degree, and this atrophy of the brain would account for the effusion of serum into the arachnoid cavity and sulci of the brain that is already seen to have been so frequently found in these cases.

In the subjoined form are tabulated some of the above results in contrast with those for Europeans, taken from "Quain's Anatomy":—

—	1 Brain Weight. M.	1 Brain Weight. F.	2 Difference.	3 Difference between extreme Weights of Brain. M.	3 Difference between extreme Weights of Brain. F.	4 Difference.	5 Body-weight to Brain-weight, 1 to M.	5 Body-weight to Brain-weight, 1 to F.
	oz.	oz.	oz.	oz.	oz.	oz.		
European	49·5	44	5·5	31	25	6	36	36·46
Hindu	41·5	37·5	4	22	21·5	0·5	*38·2	*35·8
Difference ...	8	6·5	...	...	...	...	...	...

Comparison.

It would thus appear that the actual weight of the European brain exceeds that of the Hindu by 8 oz. in the male and 6·5 oz. in the female (col. 1), while the relative weight of the brain to that of the body is about the same in both races (col. 5). Also in both races the male has the heavier brain (col. 1), but the difference between the weight of the male and female brain is greater in the European both actually (5·5 oz. as against 4 oz.) (col. 2) and relatively (4·7 oz. as against 4 oz.) Likewise in both races the range of brain weight (col. 3) is greater in the male than in the female, but this difference is not so great (col. 4), nor is the range so wide (col. 3) in the Hindu as in the European.

State of Brain.

Soft.

The brain was found to be rather soft in 99 males, 45 per cent., and 54 females, 35·5 per cent.; to be very soft in one female; and in another, a case of aphasia, it was semi-diffluent, hemispheres flat, soft and anæmic, the posterior cornu of the left hemisphere yellow on surface, and on trying to make a section found to be semi-fluid and exuding a milky fluid readily; in one male, a case of fracture of the skull, the convolutions were bruised; in one there was a buff depressed convolution on the posterior cornu of the right hemisphere, which cut soft and extended to the ventricle, looking like a half absorbed abscess, or apoplectic spot, with broken down brain tissue; and in one there was a depressed convolution on the vertex.

Firm.

In 118 males, 53·6 per cent., and 94 females, 61·8 per cent., it was found firm; and in 4 males and 1 female it was very firm, almost fibrous to section in some.

Anæmic.

In 85 males, 38·5 per cent., and 73 females, 48 per cent., it was found anæmic; besides these in 1 male the brain was yellow and anæmic and had all the appearances of being in a state of yellow atrophy; and in 6 females the anæmia was imperfectly marked.

Hyperæmic.

In 53 males, 24 per cent., and 23 females, 23 per cent., it was hyperæmic; in two of the former the color of the brain was dusky, and in a third serum oozed from the cut surface.

Healthy.

In 81 males, 36·8 per cent., and 47 females, 30·9 per cent., the brain appeared about normally injected.

Ventricles.

In 68 males, 30·9 per cent., and 48 females, 31·5 per cent., serum was found in the ventricles; of these in 67 males and 46 females this was normal in quantity and of a pale straw-color.

Dropsy of.

Both lateral ventricles in 1 male and the right lateral ventricle in 1 female were dilated, with thinned walls, fluctuating to feel and containing each about half a pint of pale serum; no tubercles were found in these cases. In 1 female the serum was about normal in quantity, but it was whitish in appearance like thin pus; and in 1 male the left lateral ventricle was filled by a rather firm dark clot.

* Plump Hindus.

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The brain substance was more or less extensively broken down by apoplectic effusion of blood in 1 male and 1 female, and one has been already mentioned under softening as presenting the appearance of an apoplectic spot absorbed.

CHEST. *Pleuræ.* Healthy.

In the males there were found 31 pairs, 25 right and 39 left, pleuræ quite healthy, or 14·1 per cent. of cases in which both pleuræ were perfectly healthy, and 42·27 per cent. in which at least one pleura was healthy. And in the females there were 33 pairs, 8 right and 17 left, pleuræ quite healthy, giving 23 per cent. in which both pleuræ were healthy, and 39·5 per cent. in which at least one was healthy.

Hydrothorax.

In the males there was an effusion of serum into healthy-looking pleuræ in 25 pairs, 11·3 per cent., 17 right, 7·7 per cent., and 19 left pleural sacs, 8·6 per cent. The serum was red when in small quantity and pale straw-colored when in large; and it varied in amount from a tablespoonful to a quart, the average quantity in the right pleural sac being 10·56 oz. and in the left 8·75 oz. And in the females there was a similar effusion in 35 pairs, 23 per cent., 10 right, 6·5 per cent., and 15 left pleural sacs, 9·75 per cent.; the quantity varied from a teaspoonful to three pints, the average in the right cavity being 10·2 oz. and in the left 10·54 oz.

Hydrothorax with old adhesions.

In males there was similar effusion with some old points of adhesion in 16 pairs, 7·2 per cent., 14 right, 6·3 per cent., and 13 left pleuræ, 6 per cent.; the average quantity of fluid in the right sac was 9·6 oz., and in the left 7·5 oz., the extremes being 2 drachms and 40 oz. And in females there were similar adhesions and effusion in 8 pairs, 5·3 per cent., 15 right, 10 per cent., and 7 left pleuræ, 4·6 per cent. The quantity of fluid varied from mere moistening to a quart, the average in the right sac being 7·06 oz. and in the left 9·95 oz. The serum was bloody in two cases.

Summary.

In all there was passive serous effusion into one or both pleural sacs in 104 males, 47·2 per cent., and 90 females, 60 per cent.; of these both sacs were engaged in 41 males, 18·6 per cent., and 43 females, 28·3 per cent.

Old adhesions.

In the males there were points of old adhesion easily broken down and not extensive in 29 pairs, 13 per cent., 46 right, 21 per cent., and 33 left pleuræ, 15 per cent.; and there were very firm old adhesions, generally extensive and often requiring careful dissection, in 9 pairs, 4 per cent., 13 right, 6 per cent., and 16 left pleuræ, 7·3 per cent. And in the females there were points of adhesion easily broken down and not extensive, of old standing, in 19 pairs, 12·5 per cent., 25 right, 16·4 per cent., and 13 left pleuræ, 8·5 per cent. The adhesions were generally extensive and very firm, requiring a knife in 9 pairs, 6 per cent., 7 right, 4·6 per cent., and 7 left pleuræ, 4·6 per cent.

In all, including the cases accompanied by hydrothorax above given, there were old adhesions found in one or both pleuræ in 189 males, 85·9 per cent., and 110 females, 72·3 per cent.; of these both sacs were engaged in 54 males, 24·5 per cent., and 36 females, 23·7 per cent.

Recent effusion.

In males there were products of recent inflammation present in 7 pairs, 3 per cent., 16 right, 7 per cent., and 11 left pleural sacs, 5 per cent.; and in females in 2 pairs, 5 right and 1 left pleuræ.

Nature of.

The nature of the effusion was a simple admixture of recent and old adhesions in one pair, 4 right and 2 left pleuræ; and in 1 right and 2 left there was some injection of the parietes, and loss of lustre over pneumonic lung spots. In 1 pair, 9 right and 1 left pleuræ, there were points of recent adhesion without marked effusion of lymph. There was a thick coating of lymph in 1 pair, and a jelly-like effusion in 2 left pleuræ. In 5 pairs, 4 right and 10 left pleuræ, there was effusion of lymph with bloody serum, averaging half a pint in quantity; and in 1 pleural cavity there was about half a pint of purulent fluid confined by firm adhesions.

Cicatrices.

In males there were cicatricial more or less puckered depression on the pleuræ of the apices of 7 pairs, 3 per cent., 3 right and 4 left lungs; and in females in 5 pairs, 5 per cent., 1 right and 2 left lungs.

Ecchymosis.

In males there were spots or streaks of subpleural ecchymosis mostly situated near the fissures and often undergoing absorption, appearing as dark-red, pigmented, or yellow streaks or spots in 1 pair, 2 right and 5 left lungs; and in females there was similar ecchymosis in 1 pair, 1 right and 3 left lungs.

LUNGS. *Healthy.* *Weight.*

In the males only 22 pairs, 10 per cent., 11 right, 5 per cent., and 14 left lungs, 6·36 per cent., were found perfectly healthy; the average weight of these 33 right lungs is 7·8 oz. the extremes being 10·6 oz., and 5·25 oz., and of the 36 left lungs is 7·1 oz., the extremes being 12·2 oz. and 4·875 oz.; and in the females only 23 pairs, 15 per cent., 6 right, 4 per cent., and 13 left lungs, 8 per cent., were quite healthy; the average weight of the 29 right lungs is 6·68 oz., the extremes being 9·5 oz. and 3·8 oz., and of the 36 left lungs, 6·1 oz., the extremes being 8·5 oz. and 3·5 oz.

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Ratio to body-weight.

Taking the above average weights, the ratio of the weight of the lungs to the average weight of the body is 1 to 87·3 in males and 1 to 78·8 in females, or taking the average weight of the pairs of healthy lungs and of the bodies appertaining thereto, the ratio is found to be 1 to 84·4 in the 22 males and 1 to 78·9 in the 23 females. Quain gives the weight of the lungs in Europeans to be in the male 24 oz. for the right and 21 oz. for the left lung, with a ratio to body-weight of 1 to 37, and in the female 17 oz. for the right and 15 for the left lung, with a ratio to body-weight of 1 to 43. It is not clear why these figures should differ so materially in the cases of Europeans and Hindus.

Apneumatosis.

In the males 10 pairs, 4·5 per cent., 10 right, 4·5 per cent., and 11 left lungs, 5 per cent., were affected by simple collapse of the lung tissue, usually confined to the posterior margin of the lower or thin anterior margin of the upper lobe, but sometimes affecting a whole lobe or even a whole lung, and often occurring in cases of pleuritic effusion. In these the part implicated was purplish in color, tough and airless on section, with at most only a little blood exuding on pressure from the cut veins, the lung remaining of about its normal weight. The average weight of these 20 right lungs is 9·9 oz. and of the 21 left lungs is 8·8.

Males.

Analysis of Cases.

The whole lung tissue was collapsed in 1 pair, and the whole lower lobe in 2 pairs, 3 right and 2 left lungs; in two of these there was a considerable amount of blood from cut surface on pressure. The collapse was confined to the posterior border in 3 pairs, 4 right and 5 left lungs; in 2 of the right lungs the veins were full, and the posterior border, inner surface, and lower tongue of upper lobe was collapsed in 1 pair. The lower anterior tongue of upper lobe was the seat of old collapse with hypertrophy of the fibrous tissue and dilatation of the air cells and bronchi, which were distended usually with inspissated mucus, in 4 pairs, 2 right and 1 left lung; in the left lung the collapse was recent, and all the other cases, except one right lung, being otherwise diseased, are not grouped under apneumatosis.

Females.

In the females similar collapse of lung tissue was found in 10 pairs, 6·5 per cent., 5 right, 3·25 per cent., and 8 left lungs, 5·3 per cent.; the average weight of the 15 right lungs is 8·6, the extremes being 12·5 oz. and 6 ozs., and of the 18 left lungs is 7·8 oz., the extremes being 15·2 oz. and 4·2 oz.

Analysis of Cases.

The collapse was confined to the posterior border in 5 pairs, 3·2 per cent., 3 right, 2 per cent., and 6 left lungs, 4 per cent.; of these the bronchi were loaded with mucus in 1 pair. The whole lower lobe was collapsed in 2 pairs, 1 right and 2 left lungs, the inner surface also being collapsed in one of these; almost the entire lung was collapsed in 2 right lungs, and in one of these the bronchi were loaded with mucus; the collapse was confined to the lower margin in 1 left and 1 right lung; in the latter some lobules were collapsed as well, and in 3 left it affected a few lobules only. In 1 right and 1 left lung, as well as in 1 pair and 3 right lungs not included under apneumatosis, there was old-standing collapse of the anterior lower tongue of the upper lobe, with hypertrophy of the fibrous tissue and dilatation and distension, with inspissated mucus of its air-cells and bronchi.

Apneumatosis with Œdema.

In males there was serous effusion into the collapsed lung tissue in 8 pairs, 3·6 per cent., 9 right, 4·5 per cent., and 5 left lungs; the average weight of the 17 right lungs is 13·5 oz., the extremes being 19 oz. and 9·2 oz., and of the 13 left lungs is 13·3 oz., the extremes being 20·5 oz. and 6·2 oz.; and in females in 12 pairs, 7·9 per cent., 4 right and 5 left lungs, the average weight of the 16 right lungs is 10·2 oz., the extremes being 15·1 oz. and 8·1 oz., and of the 17 left lungs is 10 oz., the extremes being 20·5 oz. and 7 oz.

The parts mostly affected in these cases were the posterior border of the lungs or the whole lower lobe; in some the œdema extended into the colorless lung tissue beyond the collapsed part, but in most cases it was very local and limited, as evidenced by the low average weight of the lungs. In one pair there was some softening of the lung tissue.

Simple congestion.

There was simple, generally partial and hypostatic congestion of the lungs, which were dry on section, yielding no serum and at most only a little blood on pressure from cut vessels, in males in 6 pairs, 2·7 per cent., 8 right, 3·6 per cent., and 4 left lungs, 1·8 per cent., the average weight of the 14 right lungs is 9·0 oz., with the extremes of 15·2 oz. and 7·3 oz., and of the left lung 9·0 oz., with extremes 15·7 oz. and 5 oz.; and in females in 8 pairs, 5·2 per cent., 10 right, 6·5 per cent., and 2 left lungs, the average weight of the 18 right lungs is 9·5 oz., the extremes being 14·3 oz. and 7·5 oz., and of the 10 left lungs is 8·7 oz., the extremes being 10·7 oz. and 6·1 oz.

Simple œdema.

In males there was simple œdema of the lung tissue in 4 pairs, 2 right and 3 left lungs; and in females in 1 pair, 1 right and 1 left lung. The average weight of the 6 male right lungs is 14·8 oz., the extremes being 8 oz. and 19·5 oz.; and of the 7 left lungs is 15·1 oz., the extremes being 25 oz. and 8·7 oz.; and in the females the mean weight of the 2 right lungs is 12·7 oz. and of the 2 left 8·3 oz.

In these cases the œdema was mostly confined to the dependent parts, which were pale and not friable, but on section and pressure exuded freely thin pale more or less frothy serum.

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Œdema with Congestion.

There was some congestion, mostly of dependent parts, with exudation on section of serum and blood from cut surface, without softening of lung tissue, in males, in 24 pairs, 10·9 per cent., 10 right, 4·5 per cent., and 10 left lungs, 4·5 per cent.; and in females in 21 pairs, 13·8 per cent., 5 right, 3·3 per cent., and 9 left lungs, 5·9 per cent. In the males the average weight of the 34 right lungs is 15·2 oz., the extremes being 8·7 oz. and 24·6 oz., and of the 34 left lungs is 11·9 oz., the extremes being 6·7 oz. and 19·2 oz.; and in the females the average weight of the 26 right lungs is 12·4 oz., the extremes being 7·1 oz. and 18·1 oz.; and of the 30 left lungs 11·6 oz., the extremes being 6·7 oz. and 20·2 oz.

In these cases the congestion and œdema relatively differed very considerably in different instances; in some there was much œdema, with little, mostly hypostatic, congestion, while in others the congestion was general and perhaps considerable, but with comparatively little serous effusion.

Bronchi mucus loaded.

In 4 pairs and 1 right lung the bronchi were loaded with serous mucoid or purulent fluid, while the lung tissue was either pale or dusky, and was spongy and not softened. The average weight of the right lung is 15·6 oz., the extremes being 10·7 oz. and 17·6 oz., and of the left is 12·3 oz., the extremes being 10·3 oz. and 16·6 oz. These cases were males.

Inflammatory œdema.

There was marked lividity and œdema mostly of the posterior parts, often of the whole lower lobe, and sometimes in circumscribed spots, accompanied by softening of the lung tissue, in males, in 28 pairs, 12·7 per cent., 10 right, 4·5 per cent., and 7 left lungs, 3·2 per cent.; and in females in 6 pairs, 3·9 per cent., 4 right, 2·6 per cent., and 2 left lungs.

In the males the average weight of the 38 right lungs is 20·3 oz., the extremes being 11·7 and 41·2 oz.; and of the 35 left lungs 17 oz., the extremes being 6·1 oz. and 39 oz.; and in the females the average weight of the 10 right lungs is 13·4 oz., the extremes being 10 oz. and 18 oz.; and of the 8 left lungs 10·9 oz., the extremes being 6·6 oz. and 12·8 oz.

ACUTE PNEUMONIA.

In males there was acute pneumonia present in 10 pairs, 4·5 per cent., 10 right and 10 left lungs; and in females in 7 pairs, 4·6 per cent., 4 right, 2·6 per cent., and 3 left lungs. In some the whole lung was implicated, in others only circumscribed spots were found; the majority were in the stage of red hepatization.

In males the average weight of the 20 right lungs is 27 oz., the extremes being 10 oz. and 68 oz., and of the 20 left lungs 20·5 oz., the extremes being 9·7 oz. and 46·7 oz.; and in the females the average weight of the 11 right lungs is 19·1 oz., the extremes being 13·2 oz. and 41·5 oz.; and in the 10 left lungs 15·9 oz., the extremes being 7 oz. and 22·5 oz.

CHRONIC PNEUMONIA.

Chronic pneumonia was judged to be present in males in 9 pairs, 4 per cent., 3 right and 4 left lungs; and in females in 4 pairs, 2·6 per cent., 3 right and 1 left lung. This often occupied a whole lobe, converting it into a grey semi-transparent solid tough mass, often containing cavities from dilatation or ulceration of bronchi, and seldom presenting any appearance of tubercles; in one case there was carnification of the lung conjoined.

In the males the average weight in the 12 right lungs is 18·8 oz., the extremes being 8·5 oz. and 28·625 oz., and in the 13 left lungs is 13·77 oz., the extremes being 7·75 oz. and 28·1 oz.; and in the females the average weight of the 7 right lungs is 12·23 oz., the extremes being 8·75 oz. and 77·75 oz., and of the 5 left lungs 10·5 oz., the extremes being 8·1 oz. and 14·5 oz.

GANGRENE.

Gangrene of the lung was present in males, in 2 pairs and 3 left lungs; and in females in 1 right lung, already included under pneumonia, in which the grey hepatization was passing into gangrene at one part.

In 1 pair of lungs the gangrenous spots were numerous, of the size of a lime, and surrounded by livid œdematous tissue; and in the other pair the spots were little larger than a pea, and they looked like gangrenous tubercles; they were surrounded in 1 lung by very limited redness and œdema in healthy-looking lung tissue, and in the other by solidification of a chronic pneumonic character.

In the 3 remaining lungs the gangrene appeared to be an advanced stage of very localized inflammatory œdema.

The average weight of the right lung is 14·9 oz., the extremes being 12·8 oz. and 17 oz.; and of the left lung 20·5 oz., the extremes being 13 oz. and 30·8 oz.

ABSCESS.

In one case there was found in the lower posterior margin of the left lung an abscess of the size of a lime containing yellow pus, and surrounded by red hepatization of some extent (weight of lung 18·5 oz.); the right lung was found in a state of inflammatory œdema (weight 23¼ oz.); and the man died from these causes. In one case there were two livid spots at the base of the upper lobe of the left lung, which on section disclosed two cavities full of pus, one as big as a lime, the other smaller and like a distended bronchus; the section exuded abundance of frothy serum, but was not deeply congested, only pale livid, weight 18·7 oz.; the right lung was moderately congested and

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œdematous, weight 14·7 oz.; there was no other lesion found, and the man had only complained of his chest, which he had hurt, he said, by a fall; and in one case, included above under pneumonia, of grey hepatization of the right lung, there was a large cavity on the posterior part of the upper lobe containing about a pint of mud-colored inodorous fluid, weight of lung 68 oz.

There was more or less active tubercular disease found in males in 15 pairs, 6·3 per cent., 2 right and 5 left lungs, 2·2 per cent.; and in females in 14 pairs, 9·2 per cent., and 1 left lung.

PHTHISIS.

In the males the average weight of the 17 right lungs is 18·5 oz., the extremes being 7·5 oz. and 31·75 oz.; and of the 20 left lungs 20·72 oz., the extremes being 8⅝ oz. and 31½ oz.; and in the females the average weight of the right lung is 14·46, the extremes being 5¼ oz. and 29 oz.; and of the left lung 12·3 oz., the extremes being 4·5 oz. and 21·25 oz. Besides the above, tubercular deposits in an inactive or chronic state were found in males in 5 pairs, 3 right and 3 left lungs; and in females in 5 pairs, 3 right and 1 left lung; making in all 33 males, 15 per cent., and 24 females, 15·8 per cent., in whom tubercles were found in one or both lungs. This is very far from that exemption from tubercular lung disease which is currently believed, in England at least, to be the birth-right of the Hindu in his native jungles.

Latent tubercles.

Apoplexy.

There were apoplectic spots in males in 1 pair and 1 right lung, weight of left lung 12·75 oz., and average of right 19·3, and in 1 pair and 1 right lung there were other lesions as well; and in females in 2 right lungs weighing 14·78 oz. and 16¾ oz., the mean weight being 15·43 oz.

Analysis of Cases.

The appearances in these cases were, in 1 pair of lungs, in the lower posterior margin of each was a dark red firm spot like a blood clot, the size of an orange, friable in the centre and surrounded by pale œdematous tissue; and in 1 pair there were dark red friable spots in healthy-looking lung tissue; and there were similar spots in the thin lower margin of 1 right lung; in 1 right lung there were in its thin lower margin spots the size of an almond, dark red, hard but friable to pressure; and in another there was a larger but otherwise similar spot in the middle of the lower lobe, with simple œdema around; and in a third there was a livid spot on the posterior part of the lower lobe which fluctuated to the feel, and on section there was found a cavity of the size of a flattened lemon, with soft walls, like dark blood clots and surrounded by œdema with congestion.

PERICARDIUM.

The pericardium was pearly, shining and contained no serum, in 20 males, 9·1 per cent., and in 19 females, 12·5 per cent.; and it was equally healthy in appearance, but contained serum, in 200 males, 90·9 per cent., and in 133 females, 87·5 per cent. In only 8 males, 3·6 per cent., and 7 females, 4·6 per cent., could the serum be said to be in abnormal quantity, the average amount for these being 8 oz. in the males and 10 oz. for the females, while for the whole remaining cases the average for the males is only ⅞ oz. and for the females ½ oz.

Passive serous effusion.

The color of the serum was very pale straw-colored when in larger, and higher colored when in smaller quantity, with the exception of 1 case in which it was turbid, 1 in which it was smoky, and of a third in which it was bloody and filling the sac.

Adhesions.

In males there was thickening of the pericardium in 1 case from old adhesions between the lung and its outer surface. There were other firm old adhesions of the pericardium to the heart all over in 2 cases, and to the apex in 1. There were products of recent inflammation in 2 cases; in one the cavity was lined with yellow lymph and contained about 6 oz. of dark amber fluid with jelly-like lymph floating therein, and in the other there was firm but recent lymph adherent to the anterior surface of the heart and to the pericardium opposite, with about 3 oz. of bloody serum in the cavity. In the females there was no trace of old or recent inflammation in any case.

Recent effusion.

HEART.
Œdema.

The surface of the heart was devoid of fat in 85 males, 38·63 per cent., and 30 females, 19·7 per cent.; of these the fat was replaced by œdema in 45 males and 17 females; and in other 6 males and 5 females there was œdema present, making in all 51 males, 23·18 per cent., and 22 females, 14·47 per cent. in which there was serous effusion into the cellular tissue covering the heart.

Fat.

There was only a trace of fat present in 37 males, 16·8 per cent., and in 39 females, 25 per cent.; and in 10 males, 4·8 per cent., and in 21 females, 13·8 per cent., there was noted lots of fat; in the remaining 82 males, 37·27 per cent., and 62 females, 40·7 per cent., the fat was in moderate quantity and confined to the borders of the heart.

"Soldier's spot."

The white detachable lymphy deposit known as the "Soldier's spot" was found in 36 males, 16·36 per cent., and in 22 females, 14·47 per cent.; of these in 10 males and 6 females the number of spots varied from two to six, and they were not confined to the anterior surface of the heart.

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Cavities. The cavities of the heart were noted empty in 54 males, 24·5 per cent., and in 53 females, 34·2 per cent.; in 9 males, 4 per cent., and 3 females, 2 per cent., the right side was empty, while the left contained dark blood and soft clots; and in 88 males, 40 per cent., and 32 females, 21 per cent., the left side was empty, while the right contained blood and often pale clots. In the remaining 70 males, 31·8 per cent., and 64 females, 42 per cent., there was more or less blood and clots on both sides; in 10 of the females the cavities were noted distended with blood and often with adherent clots.

Walls. The heart was noted firm in 40 males, 18·2 per cent., and in 25 females, 11·6 per cent., and it was noted flabby in 47 males, 21·36 per cent., and in 48 females, 31·5 per cent.

Among all the fatty-looking hearts examined, fatty degeneration was found present in only 2 males and 1 female.

The heart seems to be very small in Hindus, for in 93 males, 42·2 per cent., its weight was under 6 oz., averaging in fact only 5·1 oz.; and in the remainder its weight averaged only 7·2 oz.; and in 54 females, 35·6 per cent., it was under 5 oz., averaging only 4·1 oz., and the rest its weight averaged only 6·2 oz.

In the total males its average weight is 6·3 oz., with a ratio to average body-weight of 1 to 207, the extremes being 3 oz., with a ratio to body-weight of 1 to 288 in a young ryot of the Komatty caste who died quite a skeleton from diarrhœa, and 14¾ oz., with a ratio to body-weight of 1 to 83·5, in an emaciated cooly of the Pariah caste who also died from diarrhœa; and in the females the average weight is 5·4 oz., with a ratio to body-weight of 1 to 193, the extremes being 3 oz. in two cases, with a ratio to mean body-weight of 1 to 269, and 8¾ oz. also in two cases, with a ratio to mean body-weight of 1 to 147.

In the subjoined form are tabulated the results for each class in these cases, with those for Europeans taken from "Quain's Anatomy."

	1		2		3	4	
	Number.		Average Weight.		Difference.	Ratio to Body-weight 1 to.	
	M.	F.	M.	F.		M.	F.
Emaciated	181	121	6·1	5·2	0·9	202	189
Plump	28	18	7·3	7·28	0·02	219	187
Anasarcous	11	13	6·8	5·54	9·26	238	240
Total ...	220	152	6·3	5·487	0·8	207	193
Europeans	89	53	11	9	2	158	149

From this it would appear that the European has a very much larger heart than the Hindu, both actually (col. 2) and relatively to the weight of the body (col. 4); also that the differences in size between the male and female heart is much greater in the European (col. 3). The only point in which the two races seem to agree is in the female having a larger heart in proportion to the weight of the body than the male (col. 4), and in this respect the Hindu female seems relatively to have rather the advantage of her European sister (col. 4).

Peritoneum. Serum. Quality. ABDOMEN.—The peritoneum was healthy in 93 males, 41·92 per cent., and in 67 females, 44 per cent.; and it looked healthy but contained serous effusion in 122 males, 55·45 per cent., and 77 females, 50·65 per cent. The serum was generally reddish when in small quantity, and straw-colored when in large; it was whitish in three cases, and in one there was a jelly-like amber cloud floating in pale amber serum.

Quantity. The effusion was little more than a mere moistening of the membrane with a few table-spoonfuls collected in the more dependent parts, in 68 males, 30 per cent., and 41 females, 27 per cent.; in the remaining 54 males the quantity varied from a pint to two gallons, the average being two quarts fully, and in the 36 females it varied from a pint to a gallon, the average being fully two pints and a half.

Old adhesions. There were old bands of adhesions between the great omentum and the parietes in the flanks in 2 males and 3 females; and between the transverse colon and the parietes on either side in 2 males; and between the descending colon and parietes in 1 female. The appendices epiploicæ were dry and adherent to the outer surface of the colon in 2 males and 1 female; and the omentum was adherent to the colon in 2 females, all cases of sloughing in colon.

In 2 females who died from cholera there was injection of the sub-peritoneal vessels to the minutest capillaries all over gut, mesentery and parietes, without serous effusion or loss

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of lustre of the membrane. In 1 male who had been tapped recently the membrane was lustreless and the contained fluid was turbid; and in 1 male who died from enteritis there was general peritonitis present. In 2 males and 4 females there was partial peritonitis originating in approaching perforation of the gut from sloughing in the colon; usually there was little vascularity of the membrane, a quantity of whitish serum like thin pus was found in the cavity, and a deposit of lymph in the neighbourhood of the gut. In all these may be said to be 6 males, 2·7 per cent., and 7 females, 4·6 per cent., omitting the two cholera cases, in whom there was present recent peritoneal inflammation of greater or less extent.

Size.

STOMACH.—The stomach was noted enormous in 9 males, 4 per cent., and one female; large in 70 males, 31·8 per cent., and 32 females, 21 per cent.; moderate in 36 males, 11·36 per cent., and 21 females, 13·8 per cent.; small in 101 males, 45·9 per cent., and 96 females, 63 per cent.; and small and narrow like a piece of intestine in 5 males, 2 per cent., and 2 females.

Contents. Lumbrici. Fluid. Food. Gas.

It was empty in 67 males, 30 per cent., and 57 females, 37·5 per cent.; it contained lumbrici in 18 males, 8 per cent., average number 2½ nearly, and in 19 females, 12·5 per cent., average number 3 nearly; usually bile stained fluid in 98 males, 44·5 per cent., and 70 females, 46 per cent.; and more or less solid food in 24 males, 10·9 per cent., and 12 females, 8 per cent. In males three empty stomachs and five containing food were distended with gas; and in females two empty stomachs were distended with gas.

State.

The mucous coat of the stomach was smooth in 38 males, 17·2 per cent., and 33 females, 21·7 per cent.; it was in well marked rugæ in 156 males, 70·9 per cent., and 102 females, 67 per cent.; and its state in this respect was not noted in 16 males and 17 females.

Congested.

It was thin and pale to milk-white, and often bile stained in 102 males, 46·5 per cent., and 81 females, 53·2 per cent.; pale rose-colored in 29 males, 13·2 per cent., and 26 females, 17 per cent.; congested mostly in stellate or circular spots and mottling in 84 males, 38·0 per cent., and 40 females, 20·3 per cent.; and not noted in this respect in 6 males and 5 females. In 4 of the males the congestion appeared like superficial ecchymosis into the mucous membrane, and in 1 female, in which the mucous coat was pale, the peritoneal surface of the stomach was injected.

Pigmented. Ulcer.

There was more or less well marked pigmentation of the mucous coat present in 15 males, 6·8 per cent., and 1 female; there was in 1 old woman an old perforating ulcer closed in by the pancreas, which thus came to form part of the posterior wall of the stomach, and in 1 male there was on the posterior wall near the cardiac end a fungoid growth consisting of two prominences each about the size of a walnut, of a dark red color and soft to the feel.

Contents. Lumbrici. Fluid.

SMALL INTESTINES—The small intestine was empty in 43 males, 19·5 per cent., and 27 females, 17·7 per cent.; it contained lumbrici in 100 males, 45·45 per cent. (maximum number present 34, average 3·18), and 86 females, 56·57 per cent. (maximum number found 103, average 9·26); pultaceous matter, generally colored with bile, in 70 males, 31·8 per cent., and 54 females, 35 per cent.; and fluid of all colors, in 58 males, 26·3 per cent., and 43 females, 28·3 per cent. It was distended with gas in 32 males, 14·5 per cent., and in 7 females, 4·6 per cent.

JEJUNUM. Diverticula.

The jejunum had pouch-like diverticula, often containing concretions, in 3 males and 2 females; it had a small fatty tumour on the mucous membrane in 2 males and 2 females, and a fibroid tumour in 1 male.

Size.

In 2 females and 1 male the gut was so narrow as hardly to admit the blade of the scissors, and in 1 female and 1 male it was remarkably large.

Congestion. *Anæmia.*

The mucous membrane was noted healthy in 37 males, 16·8 per cent., and in 23 females, 15 per cent.; rose-colored in 45 males, 20·4 per cent., and 44 females, 29 per cent.; congested often in lengths in 78 males, 35·45 per cent., and 52 females, 34·2 per cent.; thin and pale in 38 females, 25 per cent., thin in 41 males, 18·5 per cent., and pale in 33 males, 15 per cent.; in some the whole of the mucous membrane, and in others only the valvulæ conniventes were milk-white.

Pigmentation. *Œdema.* Ecchymosis.

There was pigmentation present in 86 males, 39·1 per cent., and 45 females, 30 per cent.; and more or less well marked œdema was found in 11 males, 5 per cent., and 17 females, 11 per cent. There were spots of submucous ecchymosis in 17 males, 7·7 per cent., and 13 females, 8·5 per cent.

Mucus.

There was noted a deficiency of mucus in 51 males, 23·2 per cent., and 36 females, 23·6 per cent.; and lots of mucus in 28 males, 12·7 per cent., and 13 females, 8·5 per cent.

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Lymph. Ulcers.

There was an effusion of lymph in 3 females as a grey film adherent in patches in one, greenish and in wavy transverse lines in one, and effused into the mucous membrane in the third. And there were ulcers found in 3 males and 4 females, in 1 male and 2 females they were in the form of bands encircling the gut, and in 2 males and 2 females they were circular or longitudinal. Tubercles were present in the lungs in all except one case, in which the ulcers were numerous, transverse thick-edged bands, more or less completely encircling the gut and almost more distinctly tubercular than in any other case, one had cicatrised and caused partial constriction of the gut.

ILEUM.

There were teat-like diverticula in this part of the gut in 4 males and 2 females, one in each. There was widening with much sacculation of the lower part in 1 male, it was so narrow as hardly to admit the blade of the scissors through its whole length in one, and for six inches at its middle in one, and there was a spiral twist twice round near the lower end in one.

Congestion.

The mucous membrane was noted healthy in 38 males, 17·2 per cent., and 27 females, 17·7 per cent.; rose-colored in 31 males, 14 per cent., and 33 females, 21·7 per cent.; pale and thin in 63 males, 28·6 per cent., pale in 39 females, 25·6 per cent., and thin in 33, 21·7 per cent.; and congested usually in lower end and in lengths in 89 males, 40·4 per cent., and 42 females, 27·6 per cent.

Œdema. Pigmentation.

It was œdematous in 8 males, 3·6 per cent., and 9 females, 5·9 per cent.; and pigmented in 60 males, 27·2 per cent., and 29 females, 19 per cent.

Mucus.

There was noted a deficiency of mucus in 32 males, 14·5 per cent., and 36 females, 23·6 per cent.; and lots of mucus in 23 males, 10·4 per cent., and 13 females, 8·5 per cent.

Lymph.

There was a film of effused lymph adherent, often confined to, and always best marked in the lower part of the ileum, in 32 males, 14·5 per cent., and 22 females, 14·5 per cent., in 6 of the males there was no congestion of the membrane present.

Ulcers.

There was ulceration present in 17 males, 7·7 per cent., and 12 females, 7·9 per cent.; the nature of the ulceration was circular tubercular ulcers in 8 males and 8 females, longitudinal tubercular in 2 males, and numerous tuberculoid bands encircling the gut in a female in whom no tubercles were found in the lungs.

In 4 males and 2 females the ulcers originated in the lymphy effusion, and in 1 female, apparently in suppuration of Peyer's glands. In 1 male there was sloughing of a Peyer's patch, and in 1 punched out thick-edged pale based ulcers in lower Peyer's patches and cicatrices in higher (typhoid).

Cicatrices.

Cicatrices were present in 6 females and 3 males, viz., with tubercular ulceration in 2 females, and ulceration of lymphy effusion in a third; and with typhoid? ulceration in 1 male, and without ulceration present in 2 males and 2 females.

SOLITARY GLANDS.

There was prominence or enlargement of the solitary glands apart from concretions or infarction by tubercles in 16 males, 7·2 per cent., and 5 females, 3·3 per cent. This occurred in death from cholera in 9 males and 2 females; in death from famine diarrhœa in 1 male and 3 females; from pneumonia in 1 male; from fracture of the skull in another; and in a third from simple continued fever. In 2 males there were concretions in a few glands, and in 1 female a fibroid deposit in three glands.

Peyer's patches.

Peyer's patches were prominent and glands full of a clear fluid in 1 male who died from pneumonia; and they were prominent in a case of cholera in which the solitary glands were not so. In another case of cholera there was prominence of the valvulæ conniventes with no change in the appearance of the solitary glands. They were markedly injected in 2 cases of diarrhœa, and they were noted cribriform and of a darker color than the surroundings in 9 males.

Ecchymosis.

There were spots of submucous ecchymosis in this part of the gut in 5 males, 2 per cent., and 10 females, 6·5 per cent.

LARGE INTESTINE. *Size.*

The large intestine was narrow in 4 and very wide and sacculated in 4 males, in 2 the plicæ were very numerous, and in 1 the gut was partly constricted from a cicatrix; and in 1 female the caput coli was long and pouch-like.

Contents.

It was found empty in 119 males, 54 per cent., and 104 females, 68 per cent., and its state in this respect was not noted in 17 males and 13 females. It contained formed fæces in 5 males and 1 female; feculent pult in 11 males, 5 per cent., and 13 females, 8·5 per cent.; variously colored watery fluid in 27 males, 12·2 per cent., and 13 females, 8·5 per cent.; and scybalæ in 9 males, 4 per cent., and 5 females, 3·3 per cent.

Thread worms.

There were thread worms in the cæcum in 1 male and 2 females, and lumbrici from the small intestine in several cases. It was distended with gas in 30 males, 13·6 per cent., and 7 females, 4·6 per cent.

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Mucous Membrane.

The mucous membrane was healthy-looking in 26 males, 11·8 per cent., and 9 females, 5·9 per cent.; more or less deeply congested to a greater or less extent in 123 males, 55·8 per cent., and 65 females, 42·7·per cent.; rose-colored in 24 males, 10·9 per cent., and 25 females, 16·4 per cent.; pale and thin in 19 males, 8·6 per cent., and 10 females, 6·5 per cent.; and pale in 20 females, 13 per cent.

Pigmented.
Œdematous.

It was pigmented in 45 males, 20·4 per cent., and 22 females, 14·4 per cent.; thickened in 102 males, 46·3 per cent., and 68 females, 44·7 per cent.; œdematous in 26 males, 11·8 per cent., and 19 females, 12·5 per cent.

Lymph.

There was a film of effused lymph adherent through the whole length of the gut, in its lower end, or in patches in 65 males, 29·5 per cent., and 43 females, 28 per cent.; and soft lymph in masses, easily detachable, in 5 males (one already included under last head) and in 8 females (six included in last); and there was submucous ecchymosis in 5 males, 2 per cent., and 6 females, 4 per cent. The surface was granular in appearance in 8 males.

Lenticular glands.

The vesicular follicles were prominent in 3 males and 3 females, patent with pale swollen lips in 6 males and 1 female, patent with pigmented mouths in 3, and depressed in 1 male. They were distended with thin mucus in 1 male and 3 females; with inspissated mucus and pus in 2 males; and with pus in 7 males and 11 females; the majority of these were black-mouthed. They were infarcted with tubercles in 3 males and 1 female, and in 1 female there was an effusion of granular lymph round the margin of the opening.

Ulceration.

There was simple abrasion of the surface in 6 males and 8 females, all except 2 females with lymphy effusion. There was ulceration originating in the effused adherent lymph in 18 males, 8 per cent., and 11 females, 7·2 per cent.; and originating in the lenticular glands in 27 males, 12·2 per cent., and 23 females, 15 per cent.; of these the ulceration was due to tubercular deposit in 2 males and 2 females. There was comparatively recent ulceration of undetermined origin in 33 males, 15 per cent., and 20 females, 15 per cent.; and irregularly shaped ulcers of old standing in 14 males, 6·3 per cent., and 5 females, 3·3 per cent.

Sloughing.

There was more or less extensive sloughing of the inner coats of the gut in 35 males, 15·9 per cent., and 23 females, 15·1 per cent.; the sloughing originated from strangulation of the tissues by excessive œdema in 2 males and 4 females, and from submucous purulent effusion in 1 male. In no case had actual perforation with effusion of the contents of the gut into the abdomen occurred, but sloughing had gone so far that the gut gave way in removal in 6 males and 8 females, and in 4 of the latter it had set up local peritonitis. In 2 males actual perforation of the gut had occurred, one from an iliac abscess opening into it, and the other from ulceration of the caput coli with sinus behind confined by recent lymph.

Perforation.

Cicatrices.

There were pigmented cicatrices in 17 males, 7·7 per cent., and 11 females, 7·0 per cent.; of these in 9 males and 3 females there were no ulcers present.

Albuminoid degeneration.

In 1 female the lower part of the gut looked sodden, the other parts being healthy, and in one there were patches of submucous emphysema, rigor mortis was present. Albuminoid degeneration was looked for in many cases without any result.

LIVER.

Weight.

The average weight of the liver in the 220 males is 32·8 oz., with a ratio to average body-weight of 1 to 39·67, the extremes being 15¾ oz., with a ratio to body-weight of 1 to 71 in an old Dhobie who died quite a skeleton from famine diarrhœa, and 63¾ oz., with a ratio to body-weight of 1 to 33·5 in a healthy young ryot who died from acute pneumonia; and in the 152 females 29·4 oz., with a ratio to average body-weight of 1 to 36, the extremes being 16 oz., with a ratio to body-weight of 1 to 55 in an old Pariah who died from famine diarrhœa, and 58½ oz., with a ratio to body-weight of 1 to 19 in a Malabar woman who died from secondary cancer of the liver.

It was under 30 oz. in weight in 93 males, 42·2 per cent., averaging 25·16 oz., and in 93 females, 61 per cent., averaging 23·6 oz.; its average weight in the remaining 127 males is 38·9 oz., and 59 females 38·6 oz.

The results for the several classes are contrasted with those for Europeans in the table given in the margin. From this it would appear that the Hindu has the same amount of liver tissue in proportion to his weight as the European, the Hindu female having a relatively somewhat smaller liver than the male; also that in wasting disease or starvation, the liver loses more weight proportionally than the body generally.

—	Number.		Average Weight, Ounces.		Ratio to Average Weight of Body.	
	M.	F.	M.	F.	M.	F.
Emaciated ...	181	121	31·3	27·06	39·45	36·4
Anasarcous ...	11	13	27·3	35·625	59	37·4
Plump ...	18	28	40·6	44·78	33·6	35·76
Total ...	220	152	32·8	29·4	39·67	36·
Europeans ...	...	...	50 to 60		...	...

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Capsule. *Adhesions.* There were abnormal adhesions between the liver and surrounding parts in 27 males, 12·27 per cent., and 17 females, 11·2 per cent. The adhesions were over liver abscess in 4 males; there was adhesion by points of old standing with more or less well marked dragging out of the lower tissue under these into teat-like processes in 12 males and 6 females. The adhesions were flocculent in 5 males and 4 females, very firm all over right lobe in 3 males, and not particularized in 6 females. There was adhesion between the lower surface and gut in 1 male, and between the gall-bladder and duodenum in 1 female. Very recent adhesions by quite soft lymph were found in 2 males.

Scars. There were shallow scars on the surface in 10 males and 4 females, spots of organized lymph in 1 male and 2 females, spots of soft lymph in 1 male, and white streaks in the course of the vessels on the under-surface of the left lobe in 1 male. And the capsule was clouded in 4 males and 5 females and pigmented in part in 3 males and 2 females.

Furrows. In 15 males, 6·8 per cent., and 23 females, 15 per cent., there were furrows running across the convexity of the right lobe from behind forwards, varying in number from one to three and in depth from a mere surface marking to half an inch; and in 2 females there was a furrow run across the liver from side to side, evidently arising from wearing too tight dress; this was broad and shallow and with some whitening of the capsule along its course, characteristics not usual in the other cases. In 1 female there was a deep angular fissure on the upper part of the right lobe.

Abnormal shape. The right lobe was prominent and projecting against the falciform ligament in 5 males and 5 females, and the left lobe was long and pointed in 9 males and 5 females; in 1 female there was a ridge on the upper surface of the liver running across both lobes from side to side; in 1 female the liver was remarkably narrow, being only four inches broad, and in one (336) there was a small accessory lobe attached to the left lobe by a fibrous band of atrophied lower liver tissue.

State. *Anæmic.* *Congested.* The liver looked flat and was flabby in 50 males, 22·7 per cent., and 34 females, 22·3 per cent.; it was plump ,in 59 males, 26·8 per cent., and 59 females, 38·8 per cent.; anæmic in 27 males, 12·27 per cent., and 42 females, 27·6 per cent.; and congested in 28 females, 18·4 per cent., and 80 males, 36·36 per cent.; of the latter in one it felt almost like a bag of blood, and in six it was so much congested as to pit readily on pressure.

Healthy. *Atrophy.* It was noted healthy in 29 males, 13·2 per cent., and 5 females, 3·3 per cent. Red atrophy was noted in 8 males, 3·6 per cent., and 8 females, 5·2 per cent.; in two of the former and five of the latter, some fat cells were present; and simple atrophy was noted in 23 males, 10·4 per cent., and 5 females, 3·3 per cent.; in 8 of the males and 3 of the females some fat cells were found. In 9 males, 4 per cent., and 3 females, 2 per cent., there was atrophy of the left lobe, which was reduced to a mere trace and was often cartilaginous; and in 28 males, 12·7 per cent., and 17 females, 11·1 per cent., there was a pale atrophied margin to the left lobe, usually only a few lines in width, and sometimes confined to the lower end; and in some few cases there was atrophy of the margin opposite the fundus of the gall-bladder.

Fatty degeneration. There was fatty degeneration of the liver found in 147 males, 66·8 per cent., and 135 females, 88 per cent.; in these it was ochrey or saffron yellow, usually plump and enlarged, and one mass of fat cells in 9 males and 31 females; it was only spotted or mottled yellow, but extremely fatty in 30 males and 9 females; very fatty in 38 females; decidedly fatty in 12 males and 20 females; and only slightly fatty in 88 males and 26 females.

Albuminoid. Every liver was examined for albuminoid degeneration, but in not one was it present.

Nutmeg. The section of the liver presented a nutmeg appearance in 69 males, 31·4 per cent., and 69 females, 45·4 per cent.; in these the acini were each distinctly mapped out by a pale margin, and all the livers were markedly fatty except 1 in the females and 4 in the males; in two of these the lobules were margined dirty white, and in two they were very dark red centred with paler margins.

Hob-nail. In 6 males and 8 females there was more or less distinctly "hob-nail liver," the surface presented small prominences like papillæ in some of these.

There was pigmentation present in 18 males, 8 per cent., and 10 females, 6·3 per cent.

Abscess. Abscess was found in 5 cases, all males; in one it occupied the right lobe and contained quite a quart of fœtid pus; in one it was near the surface and contained 4 oz. of thick yellow pus; in one it was about the size of a lime, situated at the centre of the right lobe and contained yellow pus, the surrounding tissue appearing healthy; in two it was of the size a marble, situated at the surface, and contained substance of the appearance and consistence of thick white paint.

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In five other patients, one a female, abscess of the liver was seen; one of these recovered by the opening of the abscess into the gut; the others probably died.

Tumours.

There were secondary cancerous deposits in 1 male and 1 female; one or more cancerous tumours, the size of a walnut downwards, in 1 male and 3 females; tubercular deposits in 3 females, and tuberculoid in 1 female who died from diarrhœa and had lungs free from tubercles; imbedded in the surface of the liver were three or four firm white spots, the size of No. 6 shot, found to be composed of lymphoid cells and fat granules. In 1 male the liver was somewhat enlarged ($\frac{1}{31}$ instead of $\frac{1}{39}$ of body-weight) and the right end was torn in removal; on section the right half of the right lobe was seen to be occupied by four closely agglomerated masses of tissue of a pale straw-color—the largest was softened into a jelly-like mass, the others being quite fibrous, and seen under the microscope to be formed of indistinct fibres and lots of fat granules—the rest of the liver was dark red and engorged with blood. This man died from famine diarrhœa, the colon being lined by a mass of slough. And in 1 female who died from chlorosis the liver was studded all through with hard yellowish spots the size of peas, the nature of which I could not satisfactorily make out.

GALL-BLADDER.
Bile.
Color and consistence of.

The gall-bladder was very large in 1, had cystic tumours in 2 males and œdematous walls in 4 males and 1 female. It was empty in 20 males, 9 per cent., and 3 females; and in 1 female it contained only a little white mucus. It contained dark green viscid bile in 41 males, 18·6 per cent., and 47 females, 31 per cent., and thin green bile in 42 males, 19 per cent., and 23 females, 15 per cent. The bile was thin and brown in 17 males and 7 females; brown and viscid in 2 males; brown and with a sediment in 1 male; of the appearance and consistence of olive or linseed oil in 42 males, 19 per cent., and 36 females, 23·7 per cent.; thin and orange or ochrey yellow in 12 males and 11 females; orange and viscid in 1 male; yellow and grumous in 7 males and 2 females; tarry in 3 males and 2 females; dark colored in 7 males and 5 females; water with a green cloud in 1 male and 1 female; and color and consistence not noted in 20 males and 11 females. One gall-bladder was inflamed and distended with serum and pus; one was inflamed and contained pus and gall-stones, and one contained gall-stones and a little thin yellow bile; all were in males.

SPLEEN.

There were two accessory spleens in 1, and one accessory in 2 males, the size of the largest being that of a marble. The average weight of the splenic substance in the 220 males is 3·64 oz., with a ratio to average body-weight of 1 to 357, the extremes being 23 oz., with a ratio to body-weight of 1 to 56 in a cooly from Conjevaram who died from remittent fever, and $1\frac{1}{8}$ oz., with a ratio to body-weight of 1 to 1246 in an old man who died from diarrhœa; and in the 152 females, 2·73 oz., with a ratio to average body-weight of 1 to 386, the extremes being $18\frac{1}{4}$ oz., with a ratio to body-weight of 1 to 64 in a young woman who died from chlorosis, and $\frac{3}{8}$ oz., with a ratio to body-weight of 1 to 2645 in an old woman who died from diarrhœa.

—		Average Weight, Ounces.	Ratio to Average Weight of corresponding Bodies, 1 to
Hypertrophied ...	M. 25 ...	11·8	121
	F. 13 ...	9·3	123
Normal	M. 35 ...	4·65	300
	F. 30 ...	4·125	280
Atrophied ...	M. 160 ...	2·5	572
	F. 109 ...	1·567	677
Total ...	M. 220 ...	3·64	357
	F. 152 ...	2·73	386
Well nourished.	M. 23 ...	4·5	355
	F. 11 ...	4·54	308
Europeans ...	... ...	5 to 7	320 to 400
Old persons ...	... ...	...	700

On dividing the spleens into hypertrophied, normal, and atrophied, the results tabulated in the margin are obtained, and with there are contrasted results for well nourished Hindus and for Europeans, as given in "Quain's Anatomy."

Under hypertrophied are included in males 25 spleens varying in weight from 7 to 23 oz., averaging 11·88 oz., and giving a ratio to their average body-weight of 1 to 121, and in females 13, varying from 6 oz. to $18\frac{1}{4}$ oz., and averaging 9·3 oz., with a ratio to their average body-weight of 1 to 123.

Normal.

Under normal are included in males 35, varying in weight from 4 oz. to 7 oz., both weights inclusive, and averaging 4·65 oz., with a ratio to their average body-weight of 1 to 300; and in females 30, varying in weight from 3 oz. to 6 oz., both inclusive, and averaging $4\frac{1}{8}$ oz., with a ratio to average body-weight of 1 to 280.

Atrophied.

Under atrophied are included, in males, spleens under 4 oz. in weight, numbering 160, with average weight 2·5 oz., and ratio to their average body-weight of 1 to 572; and in females those under 3 oz., numbering 109, with average weight 1·567 oz., and ratio to their average body-weight of 1 to 677.

Healthy.

Taking the cases in which the body was well nourished, and excluding in males 5 spleens that were manifestly greatly enlarged, there remain 23, with an average weight of 4·5 oz., the extremes being $2\frac{1}{4}$ oz. and $8\frac{1}{4}$ oz., and a ratio to the average weight of the body in these cases of 1 to 355; and in the females, excluding 2 spleens

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that were greatly hypertrophied and 5 that were much atrophied from age, there remain 11, of an average weight of 4·54 oz., the extremes being 2½ oz. and 7 oz., and with a ratio to their average weight of 1 to 308. These ratios do not vary much from the European standard, and the ratio above found for Hindus with atrophied spleen is nearly identical with that for old Europeans; and as the majority of these cases are of old people, it would be difficult to say how far the splenic atrophy is due to starvation and how far to old age. I was so much struck at the time by the small size of the spleen in these cases generally, that I quite expected to find on comparison the greatest possible divergence from all standards.

Capsule thickened. **Adhesions.**

The capsule of the spleen was more or less thickened in 33 males, 15 per cent., and 22 females, 14·4 per cent. This consisted of considerable thickening all over in 5 males and 9 females; thickening with adhesion in 13 males and 1 female; spots of organized lymph in 7 males and 3 females; a white cloud over the surface in 4 males and 7 females; cicatrices in 1 male and 2 females; flocculi in 2 males, and reddish lymphy effusion in 1 male. There were abnormal adhesions to the surrounding parts in all in 32 males, 14·5 per cent., and 19 females, 12·5 per cent.

Pulp. **Deposits.**

The spleen was firm, not friable and deficient in pulp, with no exudation under pressure, in 166 males, 75·5 per cent., and 80 females, 52·6 per cent. It was flaccid in 76 males, 34·5 per cent., and 58 females, 38 per cent.; and plump in only 18 males, 8·2 per cent., and 23 females, 15 per cent. It was about normally friable in 52 males, 23·6 per cent., and 41 females, 27 per cent.; and very friable, breaking up under even slight pressure into brown or red pulp, like thin jam, in 18 males, 8·2 per cent., and 20 females, 13 per cent. It was pigmented in 16 males, 7·27 per cent., and 12 females, 8 per cent. In 2 females there were a few tubercular deposits of the size of peas, in 1 these were softened, and in 1 female there was a cancerous deposit.

Albuminoid degeneration.

Albuminoid degeneration was looked for in every case, but not found in a single one.

KIDNEYS.—In the 220 males the weight of the right kidney ranged from 1½ oz. to 6 oz., the average being 2·9 oz.; and of the left from 1 to 10¾ oz., the average being 2·6 oz.; these give a ratio to average body-weight of 1 to 229.

In the 152 females there was one horse-shoe kidney weighing 5½ oz., in the remainder the weight of the right kidney ranged from 1¾ oz. to 5 oz., the average being 2·7 oz.; and of the left from ⅞ oz. to 5⅝ oz., the average being 2·8 oz.; these give a ratio to average body-weight of 1 to 190.

In the males 140 right, 63·6 per cent., and 116 left kidneys, 52·5 per cent., were 3 oz. in weight and under, the average weight of the former being only 2·5 oz. and of the latter 2·4 oz.; and 80 right, 36·3 per cent., and 104 left kidneys, 47·2 per cent., were over 3 oz., the average weight of the former being 3·7 oz. and of the latter 3·8 oz.; and in the females, 102 right, 66·4 per cent., and 90 left kidneys, 59·2 per cent., were under 3 oz., the average weight of the former being 2·3 oz. and of the latter 2·2 oz.; and 49 right, 32·2 per cent., and 61 left kidneys, 40 per cent., were 3 oz. and upwards, the average weight of the former being 3·6 oz. and of the latter 3·6 oz.

—	Number.		Average Weight, oz. Avoirdupois.				Ratio to Average Weight of corresponding Bodies, 1 to	
			Males.					
	M.	F.	Right.	Left.	Right.	Left.	Males.	Females.
Emaciated	181	120	2·89	2·52	2·6	2·7	228	185
Anasarcous	11	13	2·87	2·98	2·9	2·85	276	231
Plump	28	18	3·6	3·75	3·3	3·55	217	199
Total ...	220	151	2·98	2·7	2·75	2·8	229	190
Europeans	160	74	4·5 to 6		4 to 5½		240	

In the margin is given in a tabular form the average weight of the kidney in the different classes, also that for Europeans. From this it would appear that Hindus have larger kidneys in proportion to their weight than Europeans, and that the difference in weight between the male and female kidneys is less in the former than in the latter.

Capsule.

In males the capsule was adherent in 29 pairs and 7 left kidneys, 16 per cent., in 1 it was adherent to the liver as well, and in one to the gut; and in females in 13 pairs, 2 left and 1 right kidney, 15 per cent.

Surface.

The surface was granular in 11 males and 7 females, the capsule was adherent in 5 of the former and 1 of the latter.

Cysts were found in 71 males, 32 per cent., and 35 females, 23 per cent.; these were confined to the left kidney in 10 females and 5 males; and to the right in 2 females and 2 males; in one of the latter the cysts contained bloody fluid.

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Pigmentation.

There was superficial pigmentation of the cortex in 6 males and 3 females.

Fatty degeneration.

The kidneys were more or less markedly fatty in 9 males, 41·3 per cent., and 99 females, 65 per cent.; in these they were noted very fatty in 10 males and 21 females, and only slightly fatty in 39 males and 39 females.

Congested.

They were noted anæmic in 54 males, 24·5 per cent., and 44 females, 29 per cent.; the cortex was anæmic and medula injected in 29 males, 13 per cent., and 31 females, 20·4 per cent.; and they were noted congested in 146 males, 66·4 per cent., and 60 females, 39·4 per cent.

There was a syphilitic deposit in both kidneys in 1 male and 1 female, and in the right kidney in 1 female; small abscess on the surface in 1 male; cancer in 1; sloughing and ulceration in 1 and the cortex was semi-transparent in 1 male and 1 female, and fibrous in 2 males; and there was suppurative interstitial nephritis of both kidneys in 1 female.

PANCREAS.—The average weight of the pancreas is 2·3 oz. in the males, the entremes being 1 oz. and 5½ oz.; and in the females 1·85 oz., the extremes being 3¾ oz., and ¾ oz.

Below is shewn its weight in each of the three classes, its higher weight in the well nourished bodies is most probably due to the presence of fat between the lobules. The female appears to have a decidedly smaller pancreas than the male.

	Males.	Females.
	oz.	oz.
Emaciated	2·2	1·8
Anasarcous	2·19	1·8
Plump	2·97	2·2

There were chalky concretions choking up the ducts in one case, in all others the pancreas appeared healthy.

Fat.

MESENTERY.—There was more or less fat present in the mesentery in 87 males, 40 per cent., and 80 females, 52·6 per cent.; in these there were lots in 20 males and 20 females, some in 21 males and 15 females, and only a trace in 47 males and 44 females.

Œdema.

Injected.

There was œdema of the mesentery present in 45 males, 20·4 per cent., and 25 females, 10 per cent.; in these there was a little fat present as well in 13 males and 8 females. The mesentery was injected in 9 males and 4 females; and the omentum was injected in 3 females; it was white in 4 males and 1 female from some slight thickening of the peritoneum.

The mensenteric glands were of normal size in 68 males, 30·9 per cent., and 56 females, 33·9 per cent.; they were large and swollen in 32 males, 14·5 per cent., and 6 females, 4 per cent.; and they were so atrophied as hardly to be visible in some cases even in the absence of all fat in 89 males, 40·45 per cent., and in 82 females, 52 per cent. They were pigmented in 19 males, 8·6 per cent., and 1 female; injected red in 10 males and 9 females; livid in 19 males and 20 females; and they were noted pale in 23 males and 19 females.

There was present tubercular deposit in 5 males and 6 females; concretions in 1 male and 1 female; cancer in 1 male and 1 female; and in 1 male a granular grey deposit seen under microscope to consist mainly of fat granules. Among enlarged glands some had suppurated in 1 female, and 1 was in a sloughy state in a male; and in atrophied glands there was a small abscess in 1 case, and a cyst in another, both females.

In the compilation of these notes I have received great assistance from Civil Hospital Apprentice Thomas Thyreum Pillay, who is an admirable copyist.

MADRAS,
1st *April* 1878.

A. PORTER, M.D.,
Surgeon, 4th District.

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APPENDIX II.

VITAL STATISTICS OF THE GENERAL POPULATION.

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I.

Births Registered in the Districts of the Madras Presidency during the Year 1877.

1	2			3	4			5			6			7	8	9
No.	Population according to the Census of 1871.			Districts.	Population for which Returns were received.			Number of Births Registered.			Ratio of Births per 1,000 of Population.			Number of Males Born to every 100 Females Born.	Excess of Births over Deaths per 1,000 of Population.	Excess of Deaths over Births per 1,000 of Population.
	Males.	Females.	Total.		Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.			
1	695,090	693,529	1,388,619	Ganjam	584,200	582,296	1,166,496	12,113	10,820	22,933	20·7	18·5	19·6	111·9	2·6	...
2	940,515	902,988	1,843,503	Vizagapatam	788,377	760,093	1,548,470	11,844	11,568	23,412	15·0	15·2	15·1	102·4	...	2·6
3	803,149	788,954	1,592,103	Godavery	803,149	788,954	1,592,103	15,855	14,973	30,828	19·7	18·9	19·3	105·9	...	1·3
4	737,319	714,747	1,452,066	Kistna	737,319	714,747	1,452,066	11,492	10,800	22,292	15·5	15·1	15·3	106·4	...	9·9
5	707,222	669,261	1,376,483	Nellore	707,222	669,261	1,376,483	4,024	3,668	7,692	5·6	5·4	5·5	109·6	...	42·3
6	186,596	195,330	381,926	Madras	186,596	195,330	381,926	7,545	6,384	13,929	40·0	32·6	36·4	118·1	...	83·0
7	473,828	460,695	934,523	Chingleput	473,828	460,695	934,523	6,545	5,923	12,468	13·8	12·8	13·3	110·5	...	52·7
8	885,665	869,659	1,755,324	South Arcot	885,665	869,659	1,755,324	16,187	15,209	31,396	18·2	17·4	17·8	106·4	...	37·3
9	587,390	611,765	1,199,155	Trichinopoly	587,390	611,765	1,199,155	14,998	13,969	28,967	25·5	22·8	24·1	107·3	...	31·5
10	953,492	1,019,328	1,972,820	Tanjore	953,492	1,019,328	1,972,820	28,235	26,391	54,626	29·6	25·8	27·6	106·9	...	9·8
11	657,636	670,263	1,327,899	Madura	657,636	670,263	1,327,899	11,008	9,619	20,627	16·7	14·3	15·5	114·4	...	44·2
12	836,332	857,297	1,693,629	Tinnevelly	836,332	857,297	1,693,629	14,159	13,244	27,403	16·9	15·4	16·1	106·9	...	24·3
13	467,516	446,716	914,232	Kurnool	467,516	446,716	914,232	5,277	5,230	10,507	11·2	11·7	11·4	100·9	...	82·5
14	693,280	657,687	1,350,967	Cuddapah	693,280	657,687	1,350,967	7,483	7,143	14,626	10·7	10·8	10·8	104·7	...	78·2
15	858,649	807,166	1,665,815	Bellary	858,649	807,166	1,665,815	11,221	11,207	22,428	13·0	13·8	13·4	100·1	...	79·2
16	1,020,119	994,135	2,014,254	North Arcot	981,202	948,725	1,929,927	13,297	12,294	25,591	13·5	12·9	13·2	108·1	...	69·5
17	975,140	991,222	1,966,362	Salem	975,140	991,222	1,966,362	13,263	12,403	25,666	13·4	12·5	13·0	106·9	...	77·1
18	874,642	888,037	1,762,679	Coimbatore	874,642	888,037	1,762,679	11,134	10,567	21,700	12·7	11·8	12·3	105·3	...	44·3
19	25,851	21,515	47,366	Neilgherries	25,851	21,515	47,366	696	560	1,256	26·9	26·0	26·5	124·2	...	45·8
20	459,550	458,492	918,042	South Canara	459,550	458,492	918,042	9,375	9,284	18,659	20·4	20·2	20·3	100·9	...	13·1
21	1,130,088	1,123,170	2,253,258	Malabar	1,130,088	1,123,170	2,253,258	21,089	19,351	40,440	18·6	17·2	17·9	108·9	...	4·1
	14,969,069	14,841,956	29,811,025	Total, Madras Presidency.	14,667,124	14,542,418	29,209,542	246,840	230,607	477,447	16·8	15·8	16·3	107·0	...	36·9

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II.

Deaths Registered in the Districts of the Madras Presidency during the Year 1877.

1	2	3	4	5			6	7			8		
No.	Districts.	Area in Square Miles.	Average Population per Square Mile.	Number of Deaths Registered.			Number of Males Died to every 100 Deaths of Females.	Ratio of Deaths per 1,000 of the Population.			Mean Ratio of Deaths per 1,000 during previous five Years.		
				Males.	Females.	Total.		Males.	Females.	Total.	Males.	Females.	Total.
1	Ganjam	8,313	167·1	10,878	9,012	19,890	120·7	18·6	15·4	17·04	15·05	13·6	14·3
2	Vizagapatam	18,344	100·5	14,188	13,289	27,477	106·7	17·9	17·2	17·7	15·4	13·7	14·5
3	Godavery	6,224	255·9	17,539	15,347	32,886	114·2	21·8	19·4	20·6	19·9	18·4	19·2
4	Kistna	8,036	180·7	19,914	16,711	36,625	119·1	21·5	23·3	25·2	17·7	15·9	16·9
5	Nellore	8,462	162·7	37,370	28,461	65,831	131·3	52·8	42·5	47·8	14·5	13·2	13·9
6	Madras	27	14724·1	23,317	22,319	45,636	108·9	124·9	114·2	119·4	35·1	33·4	34·3
7	Chingleput	2,753	340·7	34,535	27,178	61,713	127·1	72·8	58·9	66·03	19·4	19·5	19·5
8	South Arcot	4,873	360·3	53,527	43,227	96,754	123·8	60·4	49·7	55·1	17·1	16·2	16·7
9	Trichinopoly	3,515	341·5	36,006	30,668	66,674	117·4	61·4	50·1	55·6	20·2	19·3	19·7
10	Tanjore	3,654	540·1	38,093	35,753	73,846	106·5	39·9	35·0	37·4	24·7	22·9	23·8
11	Madura	9,502	238·5	44,432	34,878	79,310	127·3	67·5	52·0	59·7	12·9	11·4	12·2
12	Tinnevelly	5,176	327·3	37,385	31,040	68,425	120·4	44·0	36·2	40·4	19·9	18·01	18·9
13	Kurnool	7,358	130·4	46,375	39,494	85,869	117·4	97·0	88·4	93·9	19·1	17·8	18·4
14	Cuddapah	8,367	161·5	66,127	54,174	120,301	122·1	95·3	82·3	89·04	18·1	17·08	17·6
15	Bellary	11,007	151·5	86,745	67,622	154,367	113·5	101·0	83·7	92·6	18·4	18·8	18·6
16	North Arcot	7,139	282·3	90,044	69,660	159,704	129·2	91·7	73·0	82·7	21·2	20·9	21·1
17	Salem	7,483	262·9	98,088	79,274	177,362	123·7	100·5	79·9	90·1	22·8	20·6	21·7
18	Coimbatore	7,432	237·3	56,845	43,067	99,912	131·9	64·9	48·6	56·6	16·4	14·1	15·3
19	Neilgherries	749	66·0	2,005	1,424	3,429	140·8	77·5	66·1	72·3	19·5	18·4	19·0
20	South Canara	3,902	235·4	16,425	14,282	30,707	115·0	35·7	31·1	33·4	18·7	16·8	17·8
21	Malabar	6,002	367·7	27,477	22,117	49,594	124·2	24·3	19·6	22·0	18·7	15·3	17·1
	Total, Madras Presidency ...	138,318	222·9	857,315	698,997	1,556,312	122·6	58·4	48·06	53·2	18·8	17·4	18·1

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III.

Deaths Registered in the Districts of the Madras Presidency during each Month of the Year 1877.

1	2	3												4
No.	Districts.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total Deaths Registered during the Year.
1	Ganjam	1,505	1,369	2,485	2,062	1,601	1,305	1,377	1,463	1,565	1,371	2,130	1,657	19,890
2	Vizagapatam	1,792	2,564	2,765	1,800	1,449	2,030	2,027	3,060	2,842	2,521	2,388	2,239	27,477
3	Godavery	2,259	1,594	1,816	1,707	1,936	1,983	3,250	3,780	3,260	3,693	3,976	3,632	32,886
4	Kistna	3,413	4,049	3,488	2,116	1,943	2,078	3,139	4,676	3,628	2,546	2,639	2,910	36,625
5	Nellore	11,037	7,325	3,610	2,742	2,730	2,543	3,404	4,681	5,498	4,908	8,125	9,228	65,831
6	Madras	3,962	4,265	4,893	3,963	3,952	3,566	4,497	4,122	3,368	3,106	3,030	2,912	45,636
7	Chingleput	6,051	4,328	4,133	3,164	3,636	4,512	8,847	9,281	6,826	4,172	3,408	3,355	61,713
8	South Arcot	4,122	3,339	4,273	3,545	4,832	5,310	9,190	12,845	14,707	10,415	11,815	12,361	96,754
9	Trichinopoly	4,479	2,239	2,884	3,173	4,660	3,970	5,488	7,589	9,409	8,062	7,606	7,115	66,674
10	Tanjore	6,843	4,086	3,836	3,859	5,040	6,356	7,265	6,943	7,617	7,175	6,939	7,887	73,846
11	Madura	3,728	2,549	2,996	2,983	5,231	5,113	7,143	9,752	10,905	10,022	9,912	8,976	79,310
12	Tinnevelly	4,642	3,829	5,819	5,298	4,206	4,123	4,538	5,918	6,483	6,767	7,466	9,336	68,425
13	Kurnool	6,239	5,226	5,117	5,261	5,429	4,665	6,753	8,473	7,830	8,455	12,391	10,030	85,869
14	Cuddapah	13,336	11,408	7,666	6,585	7,844	8,423	10,338	11,858	9,229	7,759	12,307	13,548	120,301
15	Bellary	9,322	12,905	13,968	9,994	10,225	12,634	16,983	16,701	15,121	11,211	12,171	13,132	154,367
16	North Arcot	13,634	12,122	9,582	6,431	8,127	9,265	17,362	19,679	17,489	15,091	15,031	15,891	159,704
17	Salem	10,212	10,381	12,913	11,984	15,214	14,128	19,923	21,821	21,091	16,489	13,007	10,249	177,862
18	Coimbatore	4,987	5,797	5,095	6,008	8,732	7,527	9,021	12,203	14,369	11,690	8,294	6,189	99,912
19	Neilgherries	86	132	178	400	464	378	338	286	309	358	270	230	3,429
20	South Canara	2,243	2,435	2,614	2,266	1,810	2,011	3,071	2,908	2,667	2,696	2,753	3,288	30,707
21	Malabar	2,303	2,775	3,521	3,843	5,025	6,597	6,765	5,899	3,781	3,115	2,735	3,236	49,594
	Total, Madras Presidency ...	116,195	104,717	103,652	89,133	104,086	108,517	150,719	173,933	167,994	141,622	148,393	147,351	1,556,312
	Ratio of Deaths per 1,000 in each Month...	3·9	3·5	3·5	3·05	3·5	3·6	5·1	5·9	5·7	4·8	5·1	5·04	53·2

23	Tanjore.	M. T. Tanjore	52,014	497	352	224	598	1	...	5	1	7	618	2,296	9·5	6·7	4·3	11·4	0·1	11·8	44·1	31·2
24		M. T. Combaconum ...	44,395	257	243	336	498	1	...	11	1	13	807	2,154	5·7	5·4	7·5	11·2	0·2	18·1	48·5	27·1
25		M. T. Negapatam	48,075	444	362	213	315	1	2	12	3	18	637	1,989	9·2	7·5	4·5	6·5	0·3	13·2	41·3	28·8
26		M. T. Mayaveram	21,160	26	42	43	41	...	...	...	...	...	209	361	1·2	1·9	2·03	1·9	...	9·8	17·06	29·8
27		M. T Mannargudi	17,682	125	99	40	87	1	...	5	...	6	231	588	7·06	5·5	2·2	4·9	0·3	13·6	33·2	27·1
28	Madura.	M. T. Madura	51,806	783	59	189	535	3	2	31	1	37	1,584	3,237	15·1	1·1	3·6	11·2	0·7	30·5	62·4	36·1
29		M. T. Dindigul	12,811	167	9	195	16	...	1	...	...	1	9	397	13·03	0·7	15·2	1·2	0·07	0·7	30·9	18·8
30		T. Pereacolum	13,468	95	125	254	206	...	...	4	...	4	63	747	7·05	9·2	18·8	15·2	0·2	4·6	55·4	7·5
31		T. Cumbum	14,770	148	7	345	58	...	...	5	...	5	177	740	10·02	0·4	23·3	3·9	0·3	11·9	50·1	7·7
32		T. Pulni	12,801	355	32	113	56	...	...	2	...	2	307	865	27·7	2·4	8·8	4·3	0·1	23·9	67·5	12·9
33	Tinnevelly.	M. T. Tinnevelly	21,044	180	19	45	205	2	3	8	...	13	512	974	8·5	0·9	2·1	9·7	0·6	24·3	46·2	36·5
34		M. T. Palamcottah ...	17,785	86	55	37	180	...	1	1	...	2	362	722	4·8	3·09	2·08	10·1	0·1	20·3	40·5	31·2
35		M. T. Tuticorin	10,475	655	103	79	299	...	1	8	...	9	225	1,370	62·7	9·8	7·5	28·5	0·8	21·4	130·7	39·7
36		T. Kayalpatnam ...	11,197	79	...	10	3	...	...	2	...	2	100	194	7·05	...	0·8	0·2	0·1	8·9	17·3	11·6
37		T. Watrap	14,892	73	6	20	15	...	...	5	2	7	795	916	4·9	0·4	1·3	1·01	0·4	53·4	61·5	7·3
38		T. Nachiarcovil	14,136	96	42	8	2	...	...	6	...	6	684	838	6·7	2·9	0·5	0·1	0·4	48·3	59·2	7·2
39		T. Sankaranainarcovil ...	11,682	125	47	17	17	1	1	6	1	9	284	499	10·7	4·04	1·4	1·4	0·7	24·4	42·9	5·4
40		T. Sivagiri	14,025	205	42	15	64	...	1	6	2	9	241	576	14·6	2·9	1·00	4·5	0·6	17·1	41·06	7·6
41		T. Viravanalluri ...	12,172	91	...	28	...	1	...	1	...	2	82	208	7·4	...	2·3	...	0·1	6·7	16·6	6·9
42		T. Kulladakurch	11,580	4	...	32	84	...	...	...	...	...	194	264	0·3	...	2·7	2·9	...	16·7	22·8	9·5
43		T. Sivakasi	10,153	...	7	...	1	...	2	...	1	3	181	192	...	0·6	...	0·1	0·2	17·8	18·9	6·2
44		T. Tenkasi	10,605	49	3	24	48	...	...	...	...	...	85	209	4·6	0·2	2·2	4·5	...	8·01	19·7	7·7
45	Kurnool.	M. T. Kurnool	25,462	187	252	1,400	1,230	2	4	16	...	22	1,228	4,319	7·3	9·8	54·9	48·3	0·8	48·2	169·6	32·1
46	Cuddapah.	M. T. Cuddapah	16,184	269	47	384	170	2	3	7	2	14	246	1,130	16·6	2·9	23·7	10·5	0·8	15·2	69·8	40·7
47	Bellary.	M. T. Bellary	49,959	540	40	518	649	...	3	19	1	23	961	2,731	10·8	0·8	10·3	12·9	0·4	19·2	54·6	18·3
48		M. T. Adoni	22,722	642	79	308	67	...	..	15	1	16	192	1,304	28·2	3·4	13·5	2·9	0·7	8·4	57·3	39·2
49		M. T. Gooty	6,705	86	2	...	236	...	...	4	1	5	125	454	12·8	0·2	...	35·1	0·7	18·6	67·7	19·5
50		M. T. Anantapur	4,909	46	3	79	83	...	...	9	...	9	244	464	9·3	0·6	16.09	16·9	...	49·7	94·5	20·2
51		T. Hospett	10,060	111	69	102	14	2	...	3	1	6	2,149	2,451	11·03	6.8	10·1	1·3	0·5	213·6	243·6	9·0
52	North Arcot.	M. T. Vellore	87,569	844	84	257	499	1	2	4	...	7	955	2,646	22·4	2·2	6·8	13·2	0·1	25·4	70·4	27·6
53		M. T. Wallajahpett ...	12,099	145	17	27	174	...	...	7	2	9	590	962	11·9	1·4	2·2	14·3	0·7	48·7	79·5	31·3
54		T. Arcot	10,988	180	9	16	1	...	...	...	...	...	476	682	16·3	0·8	1·4	0·09	...	43·3	62·06	13·1
55		T. Gudiathum	10,804	101	10	157	20	...	...	1	...	1	86	325	9·3	0·9	14·5	1·8	0·09	3·3	30·1	10·9
56		T. Tripathy	10,428	107	43	197	13	1	2	4	...	7	171	588	10·2	4·1	18·9	1·2	0·6	16·4	51·6	9·9
57	Salem.	M. T. Salem	49,873	445	274	274	474	1	...	20	1	22	811	2,300	8·9	5·4	5·4	9·5	0·4	16·2	46·1	23·4
58		T. Tripatoor	12,816	280	89	169	3	1	...	8	...	9	694	1,244	21·8	6·9	18·1	0·2	0·7	54·1	97·6	10·2
59		T. Sundamungalum ...	11,783	124	8	81	7	1	...	3	...	4	51	275	10·5	0·6	6·8	0·5	0·3	4·3	23·3	4·4
60	Coimbatore.	M. T. Coimbatore	84,968	268	175	409	1,079	2	1	17	1	21	501	2,453	7·6	5·0	11·6	30·8	0·6	14·3	70·1	12·5
61		M. T. Erode	10,188	419	183	43	1,325	1	1	10	1	13	637	2,570	41·1	13·05	4·2	130·05	1·2	62·4	252·2	14·5
62		M. T. Caroor	9,378	78	23	83	48	...	...	6	..	6	91	329	8·3	2·4	8·8	5·1	0·6	9·7	35·08	4·8
63		T. Aravacoorchy	10,763	105	40	53	3	...	...	...	...	...	395	596	9·7	3·7	4·9	0·2	...	36·7	55·3	8·9

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VI—(*Continued*).

Deaths Registered from different Causes in the Districts and Towns of the Madras Presidency during the Year 1877.

1	2	3	4	5	6	7	8					9	10	11							
							Injuries.							Ratio of Deaths per 1,000 of Population.							
							Suicides.													From all Causes.	
Number.	Districts and Towns.	Population for which Returns were received.	Cholera.	Small-pox.	Fevers.	Bowel-complaints.	Males.	Females.	Wounding and Accidents.	Snake-bite and killed by Wild Beasts.	Total.	All other Causes.	Total Deaths from all Causes.	Cholera.	Small-pox.	Fevers.	Bowel-complaints.	Injuries.	All other Causes.	For the Year.	Mean of previous 5 Years.
	B—*Towns* –(Continued).																				
64	Neilgherries. M. T. Ootacamund ...	9,213	93	124	161	75	1	...	5	...	6	255	714	10·09	13·4	17·4	8·1	0·6	27·6	77·4	27·5
65	Neilgherries. M. T. Coonoor	2,908	50	29	77	220	...	...	...	...	...	78	449	17·1	9·9	26·4	75·6		25·1	154·4	33·0
66	South Canara. M. T. Mangalore	29,423	52	709	74	151	1	1	3	2	7	391	1,384	1·7	24·09	2·5	5·1	0·2	13·2	47·03	22·4
67	Malabar. M. T. Tellicherry	19,484	191	2	83	4	1	2	10	1	14	307	601	9·8	0·1	4·2	0·2	0·7	15·7	30·9	22·7
68	Malabar. M. T. Calicut	47,149	487	204	87	34	3	...	6	...	9	687	1,508	10·3	4·3	1·8	0·7	0·1	14·5	31·9	23·9
69	Malabar. M. T. Palghaut	30,689	307	43	257	70	...	2	10	2	14	611	1,302	10·0	1·4	8·3	2·2	0·4	19·9	42·4	26·1
70	Malabar. M. T. Cochin	12,315	5	4	43	45	1	...	6	...	7	192	296	0·4	0·3	3·4	3·6	0·5	15·5	24·03	31·8
71	Malabar. M. T. Cannanore	28,840	346	1	74	17	...	...	...	...	...	231	669	11·9	0·03	2·5	0·6	...	8·0	23·1	31·6
72	Malabar. T. Ponnany	11,453	6	...	41	15	...	...	...	...	...	2	64	0·5	...	3·5	1·3	...	0·1	5·5	4·6
	Total Towns ...	1,501,760	15,817	5,438	10,697	15,366	52	59	488	50	649	28,774	76,747	10·5	3·6	7·1	10·2	0·4	19·1	51·1	...

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VII.

Deaths Registered from Cholera in the Districts of the Madras Presidency during each Month of the Year 1877.

1	2	3		4		5												6			7			8
		Circles of Registration.		Villages.														Total.			Ratio of Deaths per 1,000 of Population.			
Number.	Districts.	No. in each District.	No. from which Deaths from Cholera were reported.	No. in each District.	No. from which Deaths from Cholera were reported.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Males.	Females.	Total.	Males.	Females.	Total.	Mean Ratio per 1,000 for previous 5 Years.
1	Ganjam	6	6	5,174	317	6	78	688	469	224	20	6	60	240	147	770	587	1,836	1,454	3,290	3·1	2·4	2·8	0·8
2	Vizagapatam	17	16	2,915	691	48	663	920	351	81	190	506	641	863	848	1,055	807	3,772	3,151	6,923	4·7	4·1	4·4	0·7
3	Godavery	14	14	2,128	694	...	3	23	50	189	227	825	1,324	928	1,168	1,436	899	3,796	3,276	7,072	4·7	4·1	4·4	0·2
4	Kistna	14	13	2,141	981	1,472	2,529	1,917	559	298	351	1,173	2,391	1,200	193	110	181	6,826	5,548	12,374	9·2	7·7	8·5	0·2
5	Nellore	11	11	2,184	1,252	8,816	4,804	1,556	545	365	218	222	1,182	1,302	280	177	59	11,438	8,038	19,476	16·1	12·01	14·1	0·7
6	Madras	1	1	37	37	1,596	1,099	626	449	331	378	448	384	218	125	73	34	3,221	3,025	6,246	17·2	15·5	16·3	0·7
7	Chingleput	7	7	2,394	493	1,275	413	266	154	333	214	900	591	143	58	13	31	2,540	1,851	4,391	5·3	3·8	4·6	0·5
8	South Arcot	10	10	3,118	2,044	1,608	1,249	1,770	1,289	2,259	1,738	3,629	4,947	3,370	1,055	1,220	1,649	14,241	11,542	25,783	16·1	13·2	14·7	1·1
9	Trichinopoly	8	8	1,674	1,163	2,374	619	998	1,170	2,150	1,139	1,596	1,958	2,076	656	383	333	8,653	6,794	15,447	14·7	11·1	12·8	1·5
10	Tanjore	14	14	3,967	1,497	2,982	905	755	487	1,116	1,785	1,632	1,276	1,041	380	194	545	6,986	6,112	13,098	7·3	5·9	6·6	1·9
11	Madura	9	9	1,224	678	1,680	914	1,069	1,075	2,519	1,654	1,379	2,292	1,804	539	466	256	8,820	6,827	15,647	13·4	10·1	11·7	1·1
12	Tinnevelly	12	12	1,849	1,005	1,288	1,310	2,467	2,212	1,017	854	892	1,345	1,348	567	351	568	8,269	5,945	14,214	9·8	6·9	8·3	1·1
13	Kurnool	10	10	787	517	1,989	1,463	2,008	1,715	1,437	566	473	747	81	22	...	...	5,837	4,614	10,451	12·4	10·3	11·4	0·2
14	Cuddapah	12	12	1,811	986	9,924	8,216	3,561	2,235	2,829	2,501	1,196	1,667	651	149	104	69	18,798	14,304	33,102	27·1	21·7	24·5	0·8
15	Bellary	19	19	2,543	1,167	4,191	6,953	6,945	3,415	2,708	2,714	2,215	797	224	15	2	4	17,352	12,831	30,183	20·2	15·9	18·1	0·8
16	North Arcot	12	12	5,241	2,009	9,605	8,432	5,657	2,781	3,461	2,110	3,590	3,559	1,975	891	56	78	24,283	17,862	42,145	24·7	18·6	21·8	0·9
17	Salem	10	10	5,812	2,443	6,788	7,158	8,523	6,875	7,329	2,668	2,074	2,278	2,300	797	553	290	26,651	20,982	47,633	27·3	21·1	24·2	0·9
18	Coimbatore	13	13	1,579	1,044	3,032	3,990	3,093	3,926	6,180	4,005	2,725	2,849	4,060	1,804	731	227	20,420	16,202	36,622	23·3	18·2	20·7	1·6
19	Neilgherries	3	3	20	12	...	27	30	130	213	61	6	1	6	2	...	...	291	185	476	11·3	8·6	10·04	0·1
20	South Canara	6	6	1,291	327	7	12	40	100	69	216	218	220	264	498	654	602	1,539	1,361	2,900	3·3	2·9	3·1	0·1
21	Malabar	17	16	436	255	31	379	846	1,068	1,581	2,317	1,653	1,278	467	196	68	73	5,234	4,723	9,957	4·6	4·2	4·4	0·3
	Total, Madras Presidency.	225	222	47,325	19,512	58,712	51,211	43,753	31,005	37,139	25,921	27,353	31,737	24,501	10,390	8,416	7,292	200,803	156,627	357,430	13·6	10·7	12·2	0·8

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VIII.

Deaths Registered from Small-pox in the Districts of the Madras Presidency during each Month of the Year 1877.

1	2	3		4		5												6			7		8			9
Number.	Districts.	Circles of Registration. No. in each District.	Circles of Registration. No. from which Deaths from Small-pox were reported.	Villages. No. in each District.	Villages. No. from which Deaths from Small-pox were reported.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total. Males.	Total. Females.	Total. Total.	No. of these Deaths among Children. Under 1 Year.	No. of these Deaths among Children. Under 12 Years.	Total Ratio of Deaths per 1,000 of Population. Males.	Females.	Total.	Mean Ratio per 1,000 for previous 5 Years.
1	Ganjam	6	6	5,174	Information not available.	305	236	270	238	166	139	92	45	53	42	30	30	848	798	1,646	Information not available.	Information not available.	1·4	1·3	1·4	0·7
2	Vizagapatam ...	17	14	2,915		22	27	35	20	3	10	2	...	1	1	...	3	65	59	124			0·08	0·07	0·07	0·5
3	Godavery ...	14	14	2,128		7	4	6	28	17	28	51	84	71	127	108	357	486	402	888			0·6	0·5	0·5	1·3
4	Kistna	14	14	2,141		182	185	145	126	132	147	139	100	138	201	179	345	1,036	983	2,019			1·4	1·3	1·4	1·1
5	Nellore	11	11	2,184		400	491	432	513	377	327	276	490	418	299	249	144	2,396	2,070	4,466			3·3	3·1	3·2	0·5
6	Madras	1	1	87		195	883	1,711	1,431	845	470	322	242	162	140	139	139	3,346	3,333	6,679			17·9	17·1	17·4	1·5
7	Chingleput ...	7	7	2,394		165	310	719	697	502	502	641	584	527	368	296	315	2,916	2,705	5,621			6·1	5·8	6·01	1·5
8	South Arcot ...	10	10	3,118		62	61	70	127	106	148	153	238	429	656	682	766	1,871	1,627	3,498			2·1	1·8	1·9	1·7
9	Trichinopoly ...	8	8	1,674		202	209	323	352	391	394	438	491	523	715	778	813	2,897	2,732	5,629			4·9	4·4	4·6	0·7
10	Tanjore	14	14	3,967		207	245	360	548	641	803	979	1,132	1,436	1,569	1,517	1,711	5,556	5,592	11,148			5·8	5·4	5·6	1·2
11	Madura	9	9	1,224		295	289	432	340	299	283	298	201	277	179	183	90	1,587	1,574	3,161			2·4	2·3	2·3	2·2
12	Tinnevelly ...	12	12	1,849		318	280	372	297	247	203	153	189	177	218	237	242	1,541	1,392	2,933			1·8	1·6	1·7	1·7
13	Kurnool	10	10	787		181	349	468	343	204	105	84	137	103	72	22	9	1,071	1,006	2,077			2·2	2·2	2·2	1·0
14	Cuddapah ...	12	12	1,311		371	422	714	776	621	506	446	382	248	220	146	54	2,649	2,257	4,906			3·8	3·4	3·6	0·7
15	Bellary	19	19	2,543		500	897	1,209	856	524	279	234	145	108	61	63	26	2,547	2,355	4,902			2·9	2·9	2·9	0·9
16	North Arcot ...	12	12	5,241		227	213	250	306	320	389	471	612	689	638	689	584	2,906	2,482	5,388			2·9	2·6	2·7	1·5
17	Salem	10	10	5,312		82	108	171	276	431	676	1,024	1,217	1,445	1,983	2,061	1,783	5,978	5,279	11,257			6·1	5·3	5·7	1·5
18	Coimbatore ...	13	13	1,579		58	80	103	79	109	121	168	188	305	416	339	400	1,238	1,128	2,366			1·4	1·2	1·3	0·7
19	Neilgherries ...	3	3	20		11	29	53	61	68	20	15	12	16	81	1	15	181	146	327			7·00	6·7	6·9	0·2
20	South Canara ...	6	6	1,291		1,053	1,364	1,550	1,276	724	383	263	198	85	105	73	96	4,006	3,164	7,170			8·7	6·9	7·8	0·9
21	Malabar	17	17	436		146	181	210	147	127	81	80	111	181	266	242	344	1,241	875	2,116			1·1	0·7	0·9	1·1
	Total, Madras Presidency	225	222	47,325		4,989	6,863	9,653	8,837	6,849	6,014	6,324	6,798	7,392	8,302	8,034	8,266	46,362	41,959	88,321			3·1	2·9	3·02	1·2

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IV.

Deaths Registered according to Age in the Districts of the Madras Presidency during the Year 1877.

1	2	3		4		5		6		7		8		9		10		11	
No.	Districts.	Under 1 year.		1 year and under 6.		6 years and under 12.		12 years and under 20.		20 years and under 30.		30 years and under 40.		40 years and under 50.		50 years and under 60.		60 years and upwards.	
		Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
1	Ganjam	1,480	1,254	1,479	1,225	917	718	756	749	1,303	1,122	1,214	846	1,066	695	1,078	792	1,585	1,611
2	Vizagapatam	1,135	1,157	1,482	1,434	1,164	1,169	1,336	1,294	1,713	1,606	1,845	1,537	1,907	1,598	1,871	1,729	1,735	1,765
3	Godavery	1,908	1,557	2,112	1,892	1,491	1,147	1,361	1,440	2,139	2,106	1,831	1,436	1,621	1,050	1,645	1,264	3,431	3,455
4	Kistna	1,436	1,348	2,809	2,703	2,037	1,718	1,466	1,457	2,146	2,245	1,749	1,280	1,614	914	2,035	1,354	4,622	3,692
5	Nellore	1,521	1,303	5,059	4,051	3,898	2,927	3,021	2,521	4,192	3,210	3,823	2,887	3,725	2,545	4,187	3,008	7,944	6,009
6	Madras	4,044	3,871	5,966	6,081	2,259	2,091	1,177	1,354	2,141	2,139	1,873	1,490	1,600	1,222	1,706	1,324	2,551	2,747
7	Chingleput	2,842	2,578	7,095	6,484	3,441	2,964	2,019	1,679	2,949	2,579	2,897	2,014	2,947	1,764	3,121	2,091	7,224	5,025
8	South Arcot	4,949	4,465	11,965	11,152	4,953	4,128	2,955	2,499	4,594	4,051	4,895	3,127	5,026	2,774	4,925	3,283	9,265	7,748
9	Trichinopoly	3,826	3,487	6,699	6,826	3,045	2,596	2,154	1,840	3,408	3,210	3,628	2,699	3,885	2,547	3,567	2,667	5,794	5,296
10	Tanjore	6,941	6,060	7,167	6,770	3,231	2,876	2,413	2,664	3,560	4,133	3,270	2,919	3,194	2,222	2,830	2,299	5,487	5,810
11	Madura	1,877	1,803	7,640	7,003	3,504	2,728	2,629	1,880	4,826	3,510	6,207	3,833	6,085	3,927	5,157	4,001	6,507	6,193
12	Tinnevelly	2,705	2,610	6,203	5,776	3,110	2,455	2,509	1,929	4,063	3,120	4,517	2,846	4,538	2,799	3,967	3,187	5,773	6,318
13	Kurnool	1,856	1,793	6,268	5,979	3,995	3,361	3,019	2,678	5,497	4,830	6,289	4,575	5,969	4,247	5,777	4,669	7,705	7,422
14	Cuddapah	2,481	2,271	7,422	7,337	5,998	4,969	5,269	4,666	9,214	8,273	10,232	7,197	8,895	5,649	7,889	6,012	8,787	7,869
15	Bellary	3,622	3,503	12,177	11,624	7,781	6,099	4,971	4,183	9,479	8,246	11,892	7,917	11,621	6,869	11,147	7,477	14,055	11,713
16	North Arcot	5,029	4,748	13,774	13,071	8,401	6,959	6,009	4,874	9,941	8,480	11,900	7,543	10,871	6,041	9,995	6,582	14,124	11,362
17	Salem	3,936	3,715	15,275	14,520	11,831	9,529	7,562	5,677	11,988	9,285	14,013	9,292	12,958	8,587	10,240	8,105	10,285	10,564
18	Coimbatore	2,217	1,920	8,030	7,046	6,090	4,765	4,876	3,363	7,311	5,516	7,911	5,341	7,086	4,288	6,125	4,493	7,199	6,395
19	Neilgherries	122	105	192	203	174	131	208	171	414	278	423	247	249	139	126	75	97	80
20	South Canara	1,833	1,749	2,112	1,982	915	821	1,163	1,107	2,535	2,481	2,398	1,836	1,952	1,221	1,550	1,135	1,967	1,950
21	Malabar	1,561	1,231	3,330	2,807	1,968	1,606	2,287	2,103	4,402	3,910	4,571	3,125	3,204	1,862	2,392	1,594	3,762	3,879
	Total, Madras Presidency.	57,321	52,528	134,256	125,466	80,208	65,559	59,100	50,128	97,815	84,325	107,378	73,987	100,013	62,960	91,330	67,141	129,899	116,903
	Ratio per Mille of Population.	Males 60·6 Females 55·3				32·7	30·3	26·5	21·1	36·8	29·6	57·7	43·1	83·7	55·6	131·3	96·5	338·1	291·8

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V.

Deaths Registered according to Classes in the Districts of the Madras Presidency during the Year 1877.

1	2	3				4				5			
		Population for which Returns were received.				Number of Deaths Registered.				Ratio of Deaths per 1,000 of Population.			
Number.	Districts.	Mahomedans.	Hindus.	Other Classes.	Total.	Mahomedans.	Hindus.	Other Classes.	Total.	Mahomedans.	Hindus.	Other Classes.	Total.
1	Ganjam ...	4,882	1,162,114	...	1,166,496	110	19,780	...	19,890	25·1	17·0	...	17·04
2	Vizagapatam ...	18,444	1,530,026	...	1,548,470	317	27,160	...	27,477	17·1	17·7	...	17·7
3	Godavery ...	35,173	1,556,930	...	1,592,103	489	32,397	...	32,886	13·8	20·8	...	20·6
4	Kistna ...	78,941	1,373,125	...	1,452,066	1,983	34,642	...	36,625	25·1	25·2	...	25·2
5	Nellore ...	65,670	1,310,813	...	1,376,483	2,262	63,569	...	65,831	34·4	48·4	...	47·8
6	Madras ...	50,964	330,962	...	381,926	4,209	41,427	...	45,636	82·5	125·1	...	119·4
7	Chingleput ...	23,192	911,331	...	934,523	734	60,979	...	61,713	31·6	66·9	...	66·03
8	South Arcot ...	44,567	1,710,757	...	1,755,324	1,453	95,301	...	96,754	32·3	55·7	...	55·1
9	Trichinopoly ...	32,024	1,167,131	...	1,199,155	1,095	65,579	...	66,674	34·1	56·1	...	55·6
10	Tanjore ...	102,703	1,870,117	...	1,972,820	3,047	70,799	...	73,846	20·8	37·8	...	37·4
11	Madura ...	48,592	1,279,307	...	1,327,899	1,999	77,311	...	79,310	41·1	60·4	...	59·7
12	Tinnevelly ...	84,753	1,608,876	...	1,693,629	2,441	65,984	...	68,425	28·8	41·0	...	40·4
13	Kurnool ...	107,920	806,312	...	914,232	9,209	76,660	...	85,869	85·5	95·0	...	93·9
14	Cuddapah ...	103,676	1,247,291	...	1,350,967	7,486	112,815	...	120,301	72·2	90·4	...	89·04
15	Bellary ...	127,783	1,538,032	...	1,665,815	8,968	145,399	...	154,367	70·1	94·5	...	92·6
16	North Arcot ...	83,628	1,846,299	...	1,929,927	2,957	156,747	...	159,704	35·3	84·8	...	82·7
17	Salem ...	52,312	1,914,050	...	1,966,362	2,254	175,108	...	177,362	43·0	91·4	...	90·1
18	Coimbatore ...	36,026	1,726,653	...	1,762,679	1,039	98,873	...	99,912	28·8	57·2	...	56·6
19	Neilgherries ...	1,936	45,430	...	47,366	169	3,260	...	3,429	87·6	71·7	...	72·3
20	South Canara ...	83,178	834,864	...	918,042	2,734	27,973	...	30,707	32·8	33·5	...	33·4
21	Malabar ...	581,609	1,671,649	...	2,253,258	13,730	35,864	...	49,594	23·6	21·4	...	22·0
	Total, Madras Presidency.	1,767,473	27,442,069	...	29,209,542	68,685	1,487,627	...	1,556,312	38·8	54·2	...	53·2

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VI.

Deaths Registered from different Causes in the Districts and Towns of the Madras Presidency during the Year 1877.

1	2	3	4	5	6	7	8					9	10	11							
							Injuries.							Ratio of Deaths per 1,000 of Population.							
							Suicides.													From all Causes.	
Number.	Districts and Towns.	Population for which Returns were received.	Cholera.	Small-pox.	Fevers.	Bowel-complaints.	Males.	Females.	Wounding and Accidents.	Snake-bite and killed by Wild Beasts.	Total.	All other Causes.	Total Deaths from all Causes.	Cholera.	Small-pox.	Fevers.	Bowel-complaints.	Injuries.	All other Causes.	For the Year.	Mean of previous 5 Years.
	A—Districts.																				
1	Ganjam	1,166,496	3,290	1,646	11,508	344	23	21	211	87	342	2,760	19,890	2·8	1·4	9·8	0·2	0·2	2·3	17·05	14·3
2	Vizagapatam	1,548,470	6,923	124	15,292	616	28	33	162	78	301	4,221	27,477	4·4	0·07	9·8	0·3	0·2	2·7	17·7	14·5
3	Godavery	1,592,108	7,072	888	13,398	756	44	75	236	81	436	10,336	32,886	4·4	0·5	8·4	0·5	0·2	6·5	20·6	19·2
4	Kistna	1,452,066	12,374	2,019	10,807	549	82	99	528	80	789	10,087	36,625	8·5	1·4	7·4	0·3	0·5	6·9	25·2	16·9
5	Nellore	1,376,483	19,476	4,466	26,641	1,758	99	89	368	102	658	12,832	65,831	14·1	3·2	19·3	1·2	0·4	9·3	47·8	13·9
6	Madras	381,926	6,246	6,679	5,971	14,605	27	11	1,066	...	1,104	11,031	45,636	16·3	17·4	15·6	38·2	2·8	28·8	119·4	34·3
7	Chingleput	934,523	4,391	5,621	10,500	15,082	58	25	776	99	958	25,161	61,718	4·6	6·01	11·2	16·1	1·2	26·9	66·03	19·5
8	South Arcot	1,755,824	25,783	3,498	28,610	2,987	60	49	1,128	240	1,477	34,399	96,754	14·7	1·9	16·3	1·7	0·8	19·5	55·1	16·7
9	Trichinopoly	1,199,155	15,447	5,629	13,486	3,996	51	37	292	164	544	27,572	66,674	12·8	4·6	11·2	3·3	0·4	22·9	55·6	19·7
10	Tanjore	1,972,820	13,098	11,148	5,844	2,629	21	15	504	287	827	40,300	73,846	6·6	5·6	2·9	1·3	0·4	20·4	37·4	23·8
11	Madura	1,327,899	15,647	3,161	27,393	9,035	155	106	448	107	816	23,258	79,310	11·7	2·3	20·6	6·8	0·6	17·5	59·7	12·2
12	Tinnevelly	1,698,629	14,214	2,933	10,607	9,777	73	91	430	76	670	30,224	68,425	8·3	1·7	6·2	5·7	0·3	17·8	40·4	18·9
13	Kurnool	914,232	10,451	2,077	55,394	6,646	88	62	398	40	538	10,763	85,869	11·4	2·2	60·5	7·2	0·5	11·7	93·9	18·4
14	Cuddapah	1,350,967	33,102	4,906	61,708	7,986	89	94	996	104	1,283	11,816	120,301	24·5	3·6	45·6	5·9	0·9	8·3	89·04	17·6
15	Bellary	1,665,815	30,183	4,902	30,555	13,463	67	99	777	71	1,014	74,250	154,367	18·1	2·9	18·3	8·08	0·6	44·5	92·6	18·6
16	North Arcot	1,929,927	42,145	5,383	46,124	9,703	134	118	1,387	117	1,756	54,588	159,704	21·8	2·7	23·9	5·02	0·9	28·2	82·7	21·1
17	Salem	1,966,362	47,633	11,257	50,306	9,547	113	74	787	113	1,087	57,532	177,362	24·2	5·7	25·5	4·8	0·5	29·2	90·1	21·7
18	Coimbatore	1,762,679	36,622	2,366	21,592	12,871	76	61	481	73	691	25,770	99,912	20·7	1·3	12·2	7·3	0·3	14·6	56·6	15·3
19	Neilgherries	47,366	476	327	1,527	576	2	...	20	...	22	501	3,429	10·04	6·9	32·2	12·1	0·4	10·5	72·3	19·0
20	South Canara	918,042	2,900	7,170	6,068	5,111	33	26	332	70	461	8,997	30,707	3·1	7·8	6·6	5·5	0·5	9·8	33·4	17·8
21	Malabar	2,253,258	9,957	2,116	15,910	5,329	76	35	476	99	686	15,596	49,594	4·4	0·9	7·06	2·3	0·3	6·9	22·00	17·1
	Total of Districts ...	29,209,542	357,430	88,321	469,241	183,866	1,355	1,220	11,797	2,088	16,460	491,494	1,556,312	12·2	3·02	16·06	4·5	0·5	16·8	53·2	18·1

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VI—(*Continued*).

Deaths Registered from different Causes in the Districts and Towns of the Madras Presidency during the Year 1877.

1	2		3	4	5	6	7	8					9	10	11							
								Injuries.							Ratio of Deaths per 1,000 of Population.							
								Suicides.													From all Causes.	
Number.	Districts and Towns.		Population for which Returns were received.	Cholera.	Small-pox.	Fevers.	Bowel-complaints.	Males.	Females.	Wounding and Accidents.	Snake-bite and killed by Wild Beasts.	Total.	All other Causes.	Total Deaths from all Causes.	Cholera.	Small-pox.	Fevers.	Bowel-complaints.	Injuries.	All other Causes.	For the Year.	Mean of previous 5 Years.
		B.—*Towns.*																				
1	Ganjam.	M. T. Berhampere ...	21,524	432	19	155	30	1	2	7	1	11	302	939	20·07	0·8	7·2	0·9	0·5	14·03	43·6	17·8
2		M. T. Chicacole	15,538	187	11	104	28	2	...	3	...	5	198	533	12·03	0·7	6·6	1·8	0·3	12·7	34·3	27·5
3		T. Itchapore	12,493	9	2	121	...	1	...	2	...	3	4	139	0·7	0·1	9·6	...	0·2	0·3	11·1	5·7
4		T. Purlakimidy	15,954	48	...	231	...	...	1	6	...	7	16	302	3·01	...	14·4	...	0·4	1·002	18·9	5·7
5	Vizagapatam.	M. T. Vizagapatam ...	31,462	331	1	204	104	1	3	8	...	12	781	1,433	10·5	0·03	6·5	3·3	0·4	24·8	45·5	34·5
6		M. T. Vizianagaram ...	20,164	329	2	348	84	...	1	14	...	15	167	895	16·3	0·09	17·2	1·6	0·7	8·2	44·3	24·9
7		M. T. Bimlipatam	8,601	76	...	34	53	...	...	3	...	3	129	295	8·8	...	3·9	6·1	0·3	14·9	34·3	26·6
8		T. Bobbili	14,151	124	...	134	2	3	2	1	...	6	7	273	8·7	...	9·4	0·1	0·4	0·5	19·3	3·7
9		T. Ankapalli	13,038	65	4	185	7	2	3	4	4	13	41	315	4·9	0·3	14·1	0·5	0·9	3·1	24·1	4·3
10		T. Salur	10,633	165	...	67	2	1	...	2	...	3	12	249	15·5	...	6·3	0·2	0·3	1·1	23·4	4·6
11	Godavery.	M. T. Ellore	25,433	263	8	67	34	...	1	8	1	10	539	921	10·3	0·3	2·6	1·3	0·4	21·2	36·2	27·8
12		M. T. Rajahmundry ...	19,622	278	61	64	38	...	2	12	1	15	584	1,040	14·1	3·1	3·2	1·9	0·7	29·7	53·0	18·6
13		M. T. Cocanada	17,509	172	23	112	80	...	...	9	...	9	282	678	9·8	1·3	6·4	4·5	0·5	16·1	38·7	22·6
14	Kistna	M. T. Masulipatam ...	36,015	203	7	151	22	...	...	1	2	3	344	730	5·6	0·2	4·1	0·5	0·08	9·5	20·2	17·1
15		M. T. Guntoor	17,984	...	37	48	52	...	1	8	...	9	311	457	...	2·06	2·7	2·9	0·5	17·3	25·4	18·2
16		T. Bapatla	10,690	39	2	48	...	...	...	1	...	1	7	97	3·6	0·2	4·5	...	0·09	0·6	9·07	2·3
17	Nellore.	M. T. Nellore	29,698	431	224	188	833	6	6	22	4	38	1,243	2,957	14·5	7·5	6·3	28·3	1·2	41·8	99·5	20·3
18	Chingleput.	M. T. Conjeeveram	37,317	688	114	165	1,856	...	...	13	1	14	527	3,364	18·4	3·05	4·4	49·7	0·3	14·1	90·1	22·8
19	South Arcot.	M. T. Cuddalore	39,940	220	97	145	270	1	...	7	5	13	411	1,156	5·5	2·4	3·6	6·7	0·3	10·2	28·9	17·5
20		M. T. Chedambaram ...	15,518	68	19	57	32	1	...	26	2	29	94	299	4·3	1·2	3·6	2·06	1·8	6·05	19·2	7·1
21	Trichinopoly.	M. T. Trichinopoly ...	75,306	434	479	197	1,104	1	2	14	...	17	623	2,854	5·7	6·3	2·6	14·6	0·2	8·2	37·8	22·9
22		M. T. Strirungum ...	11,271	109	151	63	280	...	...	3	1	4	438	1,045	9·6	13·3	5·5	24·8	0·3	38·8	92·7	30·2

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IX.

Deaths Registered from Fevers in the Districts of the Madras Presidency during each Month of the Year 1877.

1	2	3		4		5												6			7			8
		Circles of Registration.		Villages.														Total.			Total Ratio of Deaths per 1,000 of Population.			
Number.	Districts.	No. in each District.	No. from which Deaths from Fevers were reported.	No. in each District.	No. from which Deaths from Fevers were reported.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Males.	Females.	Total.	Males.	Females.	Total.	Mean Ratio per 1,000 for previous 5 Years.
1	Ganjam	6	6	5,174	...	928	808	1,228	1,075	933	871	969	1,004	982	867	1,049	794	6,282	5,226	11,508	10·7	8·9	9·8	9·6
2	Vizagapatam ...	17	17	2,915	...	1,408	1,333	1,395	1,131	1,087	1,452	1,136	1,837	1,483	1,174	920	936	7,880	7,412	15,292	9·9	9·7	9·8	10·4
3	Godavery	14	14	2,128	...	1,518	921	1,023	878	901	828	1,181	1,118	1,118	1,194	1,896	1,327	7,157	6,241	13,398	8·9	7·9	8·4	9·8
4	Kistna	14	14	2,141	...	895	665	696	686	690	697	786	897	1,086	1,087	1,271	1,351	5,875	4,932	10,807	7·9	6·9	7·4	7·7
5	Nellore	11	11	2,184	...	898	926	794	773	982	988	1,518	1,372	2,004	2,666	6,126	7,594	14,973	11,668	26,641	21·1	17·4	19·3	6·6
6	Madras	1	1	87	...	311	397	540	440	517	466	609	525	480	481	565	640	2,928	3,043	5,971	15·6	15·6	15·6	6·4
7	Chingleput	7	7	2,394	...	759	641	739	587	651	816	1,223	1,348	1,088	800	845	1,058	5,705	4,795	10,500	12·04	10·4	11·2	5·8
8	South Arcot ...	10	10	3,118	...	940	824	1,040	914	1,012	1,577	2,296	3,061	4,877	3,812	4,508	4,229	15,889	12,721	28,610	17·9	14·6	16·3	6·9
9	Trichinopoly ...	8	8	1,674	...	563	469	549	524	638	785	1,085	1,692	1,789	1,730	1,856	1,806	7,176	6,310	13,486	12·2	10·3	11·2	7·7
10	Tanjore	14	14	3,967	...	362	321	283	328	397	481	632	562	556	567	602	753	2,966	2,878	5,844	3·1	2·8	2·9	3·1
11	Madura	9	9	1,224	...	909	654	705	711	1,158	1,560	2,495	3,076	3,676	4,002	4,160	4,287	15,606	11,787	27,393	23·7	17·5	20·6	4·6
12	Tinnevelly	12	12	1,849	...	766	535	778	658	696	778	857	819	796	1,072	1,251	1,601	5,968	4,639	10,607	7·1	5·4	6·2	4·3
13	Kurnool	10	10	787	...	2,571	1,876	2,176	2,617	3,161	2,870	3,788	4,482	4,775	6,745	11,032	9,301	29,472	25,922	55,394	63·04	58·02	60·5	13·7
14	Cuddapah	12	12	1,811	...	2,314	2,109	2,658	2,770	3,117	3,649	5,475	5,866	5,383	5,470	10,629	12,268	33,524	28,184	61,708	48·3	42·8	45·6	12·6
15	Bellary	19	18	2,543	...	1,163	1,225	1,397	1,314	1,614	1,854	2,504	2,872	2,461	2,109	4,685	7,357	16,999	13,556	30,555	19·8	16·7	18·3	6·1
16	North Arcot ...	12	12	5,241	...	1,680	1,593	1,591	1,623	1,941	2,971	4,950	5,371	5,177	5,345	6,179	7,703	26,111	20,013	46,124	26·6	21·09	23·9	10·2
17	Salem	10	10	5,312	...	1,588	1,498	2,043	2,091	3,509	5,074	7,045	7,300	6,779	5,423	4,306	3,655	27,587	22,719	50,306	28·2	22·9	25·5	11·5
18	Coimbatore ...	13	13	1,579	...	865	769	945	922	1,055	1,400	2,327	2,898	2,938	2,662	2,555	2,256	12,430	9,162	21,592	14·2	10·3	12·2	6·7
19	Neilgherries ...	3	3	20	...	38	40	62	131	129	186	186	157	164	163	142	129	881	646	1,527	34·1	30·02	32·2	11·2
20	South Canara ...	6	6	1,291	...	276	266	237	222	268	444	1,046	905	672	593	468	681	3,203	2,865	6,068	6·9	6·2	6·6	5·8
21	Malabar	17	17	436	...	804	848	922	1,009	1,219	1,676	2,258	1,857	1,351	1,264	1,153	1,549	9,254	6,656	15,910	8·1	5·9	7·06	5·9
	Total, Madras Presidency.	225	224	47,325	...	21,556	18,713	21,801	21,404	25,670	31,418	44,366	49,034	49,085	49,226	65,693	71,275	257,866	211,375	469,241	17·5	14·5	16·06	7·6

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X.

Deaths Registered from Bowel-complaints in the Districts of the Madras Presidency during each Month of the Year 1877.

1	2	3		4		5												6			7			8
		Circles of Registration.		Villages.														Total.			Ratio of Deaths per 1,000 of Population.			
Number.	Districts.	No. in each District.	No. from which Deaths from Bowel-complaints were reported.	No. in each District.	No. from which Deaths from Bowel-complaints were reported.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Males.	Females.	Total.	Males.	Females.	Total.	Mean Ratio per 1,000 for previous 5 Years.
1	Ganjam	6	6	5,174	...	24	16	41	32	31	25	23	21	32	40	35	24	242	102	344	0·4	0·1	0·2	0·5
2	Vizagapatam	17	17	2,915	...	60	38	42	21	63	62	33	24	84	68	53	68	329	287	616	0·4	0·3	0·3	0·3
3	Godavery	14	14	2,128	...	32	38	41	70	46	51	88	72	87	92	69	70	385	371	756	0·4	0·4	0·5	0·5
4	Kistna	14	14	2,141	...	41	27	34	42	33	35	53	46	87	53	67	31	340	209	549	0·4	0·2	0·3	0·4
5	Nellore	11	11	2,184	...	118	77	70	35	28	151	178	311	276	241	156	117	1,117	641	1,758	1·5	0·9	1·2	0·5
6	Madras	1	1	37	...	706	958	1,012	824	848	1,237	1,993	1,862	1,415	1,332	1,219	1,199	7,854	6,751	14,605	42·1	34·5	38·2	5·04
7	Chingleput	7	7	2,394	...	2,455	1,440	934	528	679	946	2,549	2,249	1,580	666	580	476	8,488	6,594	15,082	17·9	14·3	16·1	2·2
8	South Arcot	10	10	3,118	...	152	114	101	96	140	158	247	348	425	382	432	392	1,782	1,205	2,987	2·01	1·3	1·7	0·9
9	Trichinopoly	8	8	1,674	...	108	70	92	82	141	197	226	443	775	752	631	479	2,279	1,717	3,996	3·8	2·8	3·3	1·2
10	Tanjore	14	14	3,967	...	178	140	111	105	161	185	276	244	341	290	330	268	1,444	1,185	2,629	1·5	1·1	1·3	1·0
11	Madura	9	9	1,224	...	147	110	149	158	272	342	943	1,256	1,611	1,539	1,336	1,172	5,133	3,902	9,035	7·8	5·8	6·8	1·1
12	Tinnevelly	12	12	1,849	...	499	367	478	425	476	534	585	927	1,112	1,257	1,378	1,739	5,295	4,482	9,777	6·8	5·2	5·7	3·8
13	Kurnool	10	10	787	...	74	76	98	96	132	289	1,332	1,731	1,320	665	536	297	3,878	2,768	6,646	8·1	6·2	7·2	0·5
14	Cuddapah	12	12	1,811	...	141	153	105	140	212	396	1,451	2,171	1,403	855	570	389	4,420	3,566	7,986	6·3	5·4	5·9	0·6
15	Bellary	19	19	2,548	...	251	334	380	296	405	649	2,510	2,932	2,297	1,558	1,086	765	8,029	5,434	13,463	9·3	6·7	8·08	1·1
16	North Arcot	12	12	5,241	...	202	172	178	153	195	231	1,014	1,812	1,704	1,590	1,398	1,054	5,559	4,144	9,703	5·6	4·3	5·02	1·1
17	Salem	10	10	5,312	...	180	169	191	297	449	680	1,310	1,842	1,511	1,346	945	627	5,441	4,106	9,547	5·5	4·1	4·8	0·9
18	Coimbatore	13	13	1,579	...	231	173	187	276	302	531	1,386	2,427	2,605	2,420	1,437	896	7,693	5,178	12,871	8·8	5·8	7·3	1·6
19	Neilgherries	8	8	20	...	11	9	12	32	24	34	56	72	73	113	92	48	351	225	576	13·5	10·4	12·1	2·4
20	South Canara	6	6	1,291	...	219	206	211	164	182	257	588	623	689	598	589	785	2,841	2,270	5,111	6·1	4·9	5·5	3·5
21	Malabar	17	17	436	...	258	307	374	402	581	687	789	716	399	298	241	277	2,906	2,423	5,329	2·5	2·1	2·3	2·7
	Total, Madras Presidency.	225	225	47,325	...	6,067	4,994	4,841	4,274	5,400	7,677	17,630	22,129	19,826	16,155	13,180	11,173	75,806	57,560	133,366	5·2	3·9	4·5	1·3

XI.

Deaths Registered among Europeans and Eurasians from different Causes in each District of the Madras Presidency and the Number of Born Dead among all Classes during the Year 1877.

1	2		3			4			5			6			7		
No.	Districts.		Population for which Returns were received.			Cholera.			Small-pox.			Fevers.			Bowel-complaints.		
			M.	F.	Total.	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.
1	Ganjam ...	Europeans ...	103	49	152	1	...	1	...	...	...	...	...	...	...	...	...
		Eurasians ...	102	103	205	...	...	...	...	...	...	2	1	3	...	...	...
2	Vizagapatam.	Europeans ...	245	152	397	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians ...	365	446	811	...	...	...	...	...	...	...	...	...	...	...	...
3	Godavery ...	Europeans ...	252	199	451	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians ...	202	183	385	1	...	1	1	...	1	1	...	1	...	...	...
4	Kistna ...	Europeans ...	53	37	90	...	...	...	...	...	...	1	...	1	...	...	...
		Eurasians ...	123	95	218	...	...	...	...	...	...	...	...	...	...	...	...
5	Nellore ..	Europeans ...	59	42	101	...	1	1	1	...	1	...	...	...	...	1	1
		Eurasians ...	121	116	237	1	...	1	1	...	1	2	1	3	...	...	...
6	Madras ...	Europeans ...	2,270	1,343	3,613	19	12	31	3	2	5	9	7	16	21	17	38
		Eurasians ...	5,810	6,203	12,013	65	77	142	32	42	74	39	45	84	74	83	157
7	Chingleput ...	Europeans ...	1,516	574	2,090	2	2	4	...	...	...	5	1	6	2	...	2
		Eurasians ...	624	947	1,571	...	...	...	2	...	2	2	1	3	2	...	2
8	South Arcot.	Europeans ...	67	56	123	3	2	5	...	...	...	...	...	...	1	...	1
		Eurasians ...	190	180	370	1	...	1	...	...	...	2	1	3	...	...	...
9	Trichinopoly.	Europeans ...	457	166	623	1	...	1	...	...	...	1	1	2	4	...	4
		Eurasians ...	287	343	630	1	5	6	1	1	2	1	1	2	1	4	5
10	Tanjore ...	Europeans ...	219	170	389	...	...	...	...	...	...	1	1	2	1	...	1
		Eurasians ...	257	265	522	...	...	...	1	...	1	4	2	6	1	2	3
11	Madura ...	Europeans ...	105	63	168	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians ...	81	92	173	...	...	...	...	...	...	...	...	...	...	...	...
12	Tinnevelly ...	Europeans ...	121	76	197	...	...	...	...	...	...	...	...	...	2	...	2
		Eurasians ...	62	71	133	1	...	1	...	1	1	1	...	1	2	...	2
13	Kurnool ...	Europeans ...	32	8	40	1	...	1	...	...	...	...	...	...	1	...	1
		Eurasians ...	92	68	160	1	...	1	...	...	...	...	...	...	...	...	...
14	Cuddapah ...	Europeans ...	53	44	97	1	...	1	1	...	1	...	...	...	...	...	...
		Eurasians ...	67	- 63	130	3	...	3	...	...	...	...	1	1	1	...	1
15	Bellary	Europeans ...	1,003	214	1,217	1	3	4	...	...	...	3	1	4	1	1	2
		Eurasians ...	521	453	974	5	2	7	...	...	...	5	2	7	1	...	1
16	North Arcot.	Europeans ...	198	150	348	4	...	4	...	...	...	...	...	...	...	...	...
		Eurasians ...	361	315	676	...	2	2	...	...	...	2	1	3	1	1	2
17	Salem ...	Europeans ...	168	88	256	3	1	4	2	...	2	...	...	...	1	1	2
		Eurasians ...	194	183	377	2	1	3	...	...	...	3	3	6	2	...	2
18	Coimbatore...	Europeans ...	109	44	153	1	...	1	...	...	...	1	...	1	...	...	...
		Eurasians ...	224	218	442	1	3	4	...	...	...	...	...	...	...	1	1
19	Neilgherries	Europeans ...	818	521	1,339	1	4	5	...	1	1	5	1	6	2	2	4
		Eurasians ...	523	273	796	1	...	1	1	1	2	1	1	2	3	2	5
20	South Canara	Europeans ...	83	47	130	1	...	1	...	...	...	...	...	...	...	...	...
		Eurasians ...	96	94	190	...	...	...	...	...	...	...	...	...	...	...	...
21	Malabar ...	Europeans ...	2,021	558	2,579	...	1	1	...	...	...	...	...	...	1	2	3
		Eurasians ...	2,780	2,633	5,413	1	...	1	...	...	...	1	2	3	3	...	3
	Total ...	Europeans ...	9,952	4,601	14,553	39	26	65	7	3	10	26	12	38	37	24	61
		Eurasians ...	13,082	13,344	26,426	84	90	174	39	45	84	66	62	128	91	93	184

1	2		8														
			Injuries.														
No.	Districts.		Suicides.			Wounds.			Accidents.			Snake-bite.			Killed by Wild Beasts.		
			M.	F.	Total.	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.
1	Ganjam ...	Europeans ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2	Vizagapatam.	Europeans ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3	Godavery ...	Europeans ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4	Kistna ...	Europeans ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5	Nellore ..	Europeans ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
6	Madras ...	Europeans ...	1	...	1	...	...	...	7	1	8	...	...	...	...	...	...
		Eurasians ...	...	...	...	...	...	...	7	2	9	...	...	...	1	...	1
7	Chingleput ...	Europeans ...	...	...	...	1	...	1	...	...	...	...	...	...	...	...	...
		Eurasians ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
8	South Arcot.	Europeans ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
9	Trichinopoly.	Europeans ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
10	Tanjore ...	Europeans ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
11	Madura ...	Europeans ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
12	Tinnevelly ...	Europeans ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
13	Kurnool ...	Europeans ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
14	Cuddapah ...	Europeans ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
15	Bellary	Europeans ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
16	North Arcot.	Europeans ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
17	Salem ...	Europeans ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
18	Coimbatore...	Europeans ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
19	Neilgherries	Europeans ...	...	...	...	1	...	1	...	...	...	...	...	...	...	...	...
		Eurasians ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
20	South Canara	Europeans ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
21	Malabar ...	Europeans ...	...	...	...	...	...	...	2	...	2	...	...	...	...	...	...
		Eurasians ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Total ...	Europeans ...	1	...	1	2	...	2	9	1	10	...	...	...	...	...	...
		Eurasians ...	...	...	...	...	...	...	7	2	9	...	...	...	1	...	1

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XI—(Continued).

Deaths Registered among Europeans and Eurasians from different Causes in each District of the Madras Presidency and the Number of Born Dead among all Classes during the Year 1877.

No.	Districts.		Population for which Returns were received. M.	Population F.	Population Total.	9 All other Causes. M.	9 F.	9 Total.	10 Total Deaths from all Causes. M.	10 F.	10 Total.	11 Total Births. M.	11 F.	11 Total.	12 Ratio per 1,000 of Population. Cholera.	Small-pox.	Fevers.	Bowel-complaints	Injuries.	Total Deaths. M.	Total Deaths. F.	Total Deaths. Total.	Total Births. M.	Total Births. F.	Total Births. Total.	13 Born Dead among all Classes. M.	F.	Total.
1	Ganjam ...	Europeans ...	103	49	152	2	...	2	3	...	3	2	3	5	6·5	...	...	...	...	29·1	...	19·7	19·4	61·2	32·2	111	98	209
		Eurasians ...	102	103	205	1	...	1	3	1	4	3	3	6	...	...	14·6	...	...	29·4	9·7	19·5	29·4	29·1	29·2			
2	Vizagapatam.	Europeans ...	245	152	397	...	...	...	...	...	...	6	1	7	...	...	...	...	...	...	...	...	24·5	6·5	17·6	424	419	843
		Eurasians ...	365	446	811	3	2	5	3	2	5	9	9	18	...	...	...	...	...	8·2	4·5	6·1	24·6	20·2	22·2			
3	Godavery ...	Europeans ...	252	199	451	4	2	6	4	2	6	4	1	5	...	...	...	...	...	15·9	10·1	13·3	15·9	5·0	11·1	196	219	415
		Eurasians ...	202	183	385	5	2	7	8	2	10	3	7	10	2·6	2·6	2·6	...	...	39·5	10·9	25·9	14·8	38·2	25·9			
4	Kistna ...	Europeans ...	53	37	90	...	...	...	1	...	1	2	1	3	...	...	11·1	...	...	18·8	...	11·1	37·7	27·0	33·3	115	99	214
		Eurasians ...	123	95	218	1	...	1	1	...	1	...	1	1	...	...	...	...	...	8·1	...	4·6	...	10·5	4·6			
5	Nellore ...	Europeans ...	59	42	101	2	5	7	3	7	10	4	3	7	9·9	9·9	...	9·9	...	50·8	166·6	99·0	67·8	71·4	69·3	183	65	248
		Eurasians ...	121	116	237	1	1	2	5	2	7	...	2	2	4·2	4·2	12·6	...	...	41·3	17·2	29·5	...	17·2	8·4			
6	Madras ...	Europeans ...	2,270	1,343	3,613	67	33	100	127	72	199	48	46	94	8·8	1·3	4·4	10·5	2·4	55·9	53·6	55·1	21·1	34·2	26·0	158	152	310
		Eurasians ...	5,810	6,208	12,018	150	158	308	368	407	775	163	180	343	11·8	6·1	6·9	13·0	0·8	63·3	65·6	64·5	28·1	29·0	28·5			
7	Chingleput ...	Europeans ...	1,516	574	2,090	40	13	53	50	16	66	16	9	25	1·9	...	2·9	0·9	0·4	32·9	27·8	31·5	10·5	15·7	11·9	202	178	380
		Eurasians ...	624	947	1,571	7	8	15	13	9	22	2	6	8	...	1·2	1·9	1·2	...	20·8	9·5	14·0	8·2	6·3	5·1			
8	South Arcot.	Europeans ...	67	56	123	1	...	1	5	2	7	1	4	5	40·6	...	...	8·1	...	74·6	35·7	56·9	14·9	71·4	40·6	334	263	527
		Eurasians ...	190	180	370	4	2	6	7	3	10	5	2	7	2·7	...	8·1	...	...	36·8	16·6	27·0	26·3	11·1	18·9			
9	Trichinopoly.	Europeans ...	457	166	623	3	4	7	9	5	14	8	10	18	1·6	...	3·2	6·4	...	19·7	30·1	22·4	17·5	60·2	28·8	380	339	719
		Eurasians ..	287	343	630	2	3	5	6	14	20	4	7	11	9·5	3·2	3·2	7·9	...	20·9	40·8	31·7	13·9	20·4	17·4			
10	Tanjore ...	Europeans ...	219	170	389	8	3	11	10	4	14	3	2	5	...	...	5·1	2·6	...	45·6	23·5	35·9	13·7	11·7	12·8	1,007	867	1,874
		Eurasians ...	257	265	522	4	7	11	10	11	21	11	11	22	...	1·9	11·5	5·7	...	38·9	41·5	40·2	42·8	41·5	42·1			
11	Madura ...	Europeans ...	105	63	168	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	187	123	310
		Eurasians ...	81	92	173	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...			
12	Tinnevelly ...	Europeans ...	121	76	197	3	1	4	5	1	6	3	2	5	...	...	...	10·1	...	41·3	13·1	30·4	24·8	26·3	25·3	338	285	618
		Eurasians ...	62	71	133	3	...	3	7	1	8	6	7	13	7·5	7·5	7·5	15·0	...	112·9	14·1	60·1	96·7	98·6	97·7			
13	Kurnool ...	Europeans ...	32	8	40	2	...	2	4	...	4	...	...	...	25·0	...	...	25·0	...	125·0	...	100·0	...	...	...	76	73	149
		Eurasians ...	92	68	160	...	...	...	1	...	1	1	1	2	6·2	...	...	...	...	10·8	...	6·2	10·8	14·7	12·5			
14	Cuddapah ...	Europeans ...	53	44	97	1	...	1	3	...	3	...	...	...	10·3	10·3	...	...	...	56·6	...	30·9	...	...	...	91	99	190
		Eurasians ...	67	63	130	2	...	2	6	1	7	...	...	...	23·1	...	7·7	7·7	...	89·5	15·8	53·8	...	...	...			
15	Bellary ...	Europeans ...	1,003	214	1,217	12	11	23	17	16	33	11	8	19	3·3	...	3·3	1·6	...	16·9	74·7	27·1	10·9	37·4	15·6	205	216	421
		Eurasians ...	521	453	974	6	10	16	16	16	32	10	14	24	7·2	...	7·2	1·0	...	30·7	35·3	32·8	19·2	30·9	24·6			
16	North Arcot.	Europeans ...	198	150	348	2	1	3	6	1	7	1	1	2	11·5	...	...	...	...	30·3	6·6	20·1	5·0	6·6	5·7	305	260	565
		Eurasians ...	361	315	676	3	5	8	6	8	14	2	1	3	2·9	...	4·4	2·9	...	16·6	25·4	20·7	5·5	3·2	4·4			
17	Salem ...	Europeans ...	168	88	256	3	...	3	9	2	11	1	1	2	15·6	7·8	...	7·8	...	53·5	22·7	42·9	5·9	11·3	7·8	178	196	364
		Eurasians ...	194	183	377	4	...	4	11	4	15	7	5	12	7·9	...	15·8	5·8	...	56·7	21·8	39·7	36·1	27·3	31·7			
18	Coimbatore...	Europeans ...	109	44	153	...	1	1	2	1	3	2	2	4	6·5	...	6·5	...	...	18·3	22·7	19·6	18·3	45·4	26·1	144	128	272
		Eurasians ...	224	218	442	3	1	4	4	5	9	4	7	11	9·0	...	...	2·2	...	17·8	22·9	20·3	17·8	32·1	24·9			
19	Neilgherries.	Europeans ...	818	521	1,339	33	20	53	42	28	70	39	39	78	3·7	0·7	4·4	2·9	0·7	51·3	53·7	52·2	47·6	74·8	58·2	7	4	11
		Eurasians ...	523	273	796	4	4	8	9	8	17	14	12	26	1·2	2·4	2·4	6·2	...	17·2	29·3	21·3	26·8	43·9	32·6			
20	South Canara	Europeans ...	83	47	130	...	...	...	1	...	1	6	2	8	7·7	...	...	...	...	12·0	...	7·7	72·8	42·5	61·5	329	276	605
		Eurasians ...	96	94	190	...	...	...	...	...	...	...	2	2	...	...	...	...	...	...	...	...	...	21·2	10·5			
21	Malabar ...	Europeans ...	2,021	558	2,579	9	12	21	12	15	27	15	17	32	0·4	...	...	1·1	0·8	5·9	26·8	10·4	7·4	30·4	12·4	332	270	602
		Eurasians ...	2,780	2,633	5,413	7	6	13	12	8	20	18	20	38	0·2	...	0·5	0·5	...	4·3	8·0	3·7	6·5	7·5	7·0			
	Total ...	Europeans ...	9,952	4,601	14,553	192	106	298	318	172	485	172	152	324	4·4	0·7	2·6	4·2	0·9	31·4	37·4	33·3	17·8	33·0	22·2	5,297	4,619	9,916
		Eurasians ...	13,082	13,344	26,426	210	209	419	496	502	998	262	297	559	6·5	3·1	4·8	6·9	0·3	37·8	37·6	37·7	20·0	22·2	21·1			

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Return showing the Births and Deaths Registered in the Municipalities of the Madras Presidency during the Year 1877.

Districts.	Municipal Towns.	Population.	Births. Class. Christians.	Births. Class. Mahomedans.	Births. Class. Hindus.	Births. Class. Other Classes.	Total Births. Males.	Total Births. Females.	Total Births. Total.	Deaths. Christians.	Deaths. Mahomedans.	Deaths. Hindus.	Deaths. Other Classes.	Total Death. M.	Total Death. F.	Total Death. Total.	Cholera. M.	Cholera. F.	Small-pox. M.	Small-pox. F.	Fevers. M.	Fevers. F.
Bellary ...	Bellary	51,766	31	155	279	...	242	223	465	78	566	1,825	2	1,623	848	2,471	318	219	24	15	219	172
	Adoni	22,723	...	146	263	...	226	183	409	2	297	1,009	...	685	623	1,308	351	293	38	41	155	153
	Gooty	6,730	1	16	36	...	24	29	53	...	63	391	...	228	226	454	38	48	...	2	...	...
	Anantapur	4,918	...	40	112	...	74	78	152	...	92	372	...	267	197	464	27	19	1	2	39	40
Chingleput ...	Conjeveram	37,327	1	20	676	...	367	330	697	1	72	3,313	...	1,855	1,531	3,386	398	295	65	49	104	61
Coimbatore ...	Coimbatore	35,310	40	60	865	...	479	486	965	51	77	2,349	...	1,437	1,040	2,477	166	105	92	83	236	174
	Erode	10,201	22	29	153	...	100	104	204	24	61	2,488	...	1,478	1,095	2,573	247	173	81	52	24	19
	Caroor	9,378	2	13	208	...	107	116	223	1	9	319	...	181	148	329	40	39	11	9	47	37
	Mettapolliem	4,144	1	3	48	...	25	27	52	9	14	660	...	406	277	683	49	43	6	3	50	38
Cuddapah ...	Cuddapah	16,275	9	119	221	...	163	186	349	23	329	791	...	642	501	1,143	160	111	25	23	210	174
Ganjam ...	Chicacole	15,587	...	13	245	...	134	124	258	1	81	505	...	288	249	537	96	91	4	7	53	51
	Berhampore	21,670	4	31	448	2	260	225	485	3	60	880	...	529	414	943	254	180	8	11	91	65
Godavery ...	Cocanada	17,839	17	20	527	...	281	283	564	20	36	639	2	397	300	697	90	83	16	7	74	39
	Rajahmundry	19,738	12	33	560	...	296	309	605	7	79	957	...	562	481	1,043	137	141	31	31	47	17
	Ellore	25,487	8	113	677	...	433	365	798	5	118	808	...	476	455	931	136	123	4	4	37	26
Kistna ...	Masulipatam	36,188	7	50	437	...	254	240	494	2	66	670	2	360	380	740	91	112	6	1	70	81
	Guntoor	18,033	10	122	270	...	211	191	402	13	82	374	...	271	198	469	...	...	17	20	24	24
Kurnool ...	Kurnool	25,579	8	302	380	...	334	356	690	22	1,212	3,095	...	2,251	2,078	4,329	109	80	118	134	702	698
Madras ...	Madras	397,552	967	1,144	12,261	...	7,756	6,616	14,372	2,397	4,209	39,998	...	23,812	22,792	46,920	3,305	3,114	3,381	3,377	2,976	3,095
Madura ...	Madura	51,987	96	168	2,082	...	1,276	1,070	2,346	75	325	2,898	...	1,915	1,383	3,298	500	287	26	33	101	88
	Dindigul	12,865	66	36	267	1	192	178	370	48	72	476	...	318	278	596	145	126	7	6	8	9
Malabar ...	Tellicherry	20,504	32	152	256	1	223	218	441	32	225	362	3	325	297	622	89	104	1	1	43	37
	Calicut	47,962	2	268	564	...	433	401	834	18	497	954	2	758	713	1,471	197	230	90	76	67	35
	Palghaut	30,752	28	122	1,070	...	641	579	1,220	44	171	1,163	...	775	603	1,378	200	171	23	20	163	120
	Cochin	13,840	287	54	64	...	229	176	405	156	75	86	...	172	145	317	3	2	4	...	19	24
	Cannanore	31,358	103	147	282	8	268	272	540	90	380	229	4	369	334	703	172	175	...	1	44	32

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Return showing the Births and Deaths Registered in the Municipalities of the Madras Presidency during the Year 1877—(Continued).

Districts.	Municipal Towns.	Deaths—(*Continued*). Causes of Death—(*Continued*). Bowel-complaints.		Injuries. Suicides.		Injuries. Wounds.		Injuries. Accidents.		Injuries. Snake-bite.		Injuries. Killed by Wild Beasts.		All other Causes.		Ratio per 1,000 of Population. Cholera.	Small-pox.	Fevers.	Bowel-complaints.	Injuries.	Total Deaths.	Total Births.	Average Ratio for 3 Years ending 1876 per 1,000 of Population. Total Deaths.	Total Births.
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.									
Bellary	Bellary	539	87	...	3	5	4	5	4	1	...	...	...	512	344	10·3	0·7	7·5	12·09	0·4	47·7	8·9	24·6	25·8
	Adoni	41	26	...	...	...	1	7	7	1	...	...	...	92	102	28·3	3·4	13·5	2·9	0·7	57·5	17·9	45·5	39·3
	Ghooty	121	115	...	...	2	...	...	2	1	...	...	...	66	59	12·7	0·2	...	35·07	0·7	67·4	7·8	24·3	19·4
	Anantapur	48	35	...	...	5	1	1	2	...	...	...	...	147	97	9·3	0·6	16·06	16·8	1·8	94·3	30·9	23·5	32·2
Chingleput	Conjeveram	999	858	...	...	2	2	5	4	1	...	...	...	286	262	18·4	3·0	4·4	49·7	0·3	90·7	18·6	27·4	25·0
Coimbatore	Coimbatore	663	417	2	1	...	1	7	9	1	...	...	...	270	250	7·6	4·9	11·6	30·5	0·5	70·1	27·3	13·7	21·1
	Erode	774	551	1	1	5	4	...	1	...	...	...	1	347	292	41·1	13·03	4·2	129·8	1·2	252·2	19·9	22·6	17·7
	Caroor	29	29	...	...	3	1	2	...	...	...	...	...	49	33	8·4	2·1	8·9	6·1	0·6	85·0	23·7	22·3	27·5
	Mettapolliem	281	180	...	...	...	...	1	2	...	...	...	...	19	11	22·2	2·1	21·2	111·4	0·7	164·8	12·5	...	...
Cuddapah	Cuddapah	106	65	2	3	3	2	...	2	2	...	...	...	134	121	16·6	2·9	23·5	10·5	0·8	70·2	21·4	49·6	18·2
Ganjam	Chicacole	20	8	2	...	...	...	3	...	...	...	...	...	110	92	11·9	0·7	6·6	1·7	0·3	34·4	16·5	26·8	20·2
	Berhampore	11	9	1	2	3	1	2	1	...	1	...	...	159	144	20·02	0·8	7·1	0·9	0·5	43·5	22·3	20·7	17·1
Godavery	Cocanada	44	36	...	...	1	...	7	1	...	...	...	...	165	134	9·6	1·2	6·3	4·4	0·5	39·0	31·6	28·9	29·9
	Rajahmundry	23	15	...	2	...	...	9	3	...	...	...	1	316	270	14·0	3·1	3·2	1·9	0·7	52·8	30·6	20·8	16·4
	Ellore	18	15	...	1	...	...	1	7	...	1	...	...	280	278	10·1	0·3	2·4	1·2	0·3	36·5	31·3	26·2	25·6
Kistna	Masulipatam	14	8	...	...	...	...	1	...	...	1	1	...	177	177	5·6	0·1	4·1	0·6	0·08	20·4	13·6	14·8	13·1
	Guntoor	25	27	...	1	1	...	5	2	...	...	...	...	199	124	...	2·05	2·6	2·8	0·4	25·9	22·2	18·1	22·4
Kurnool	Kurnool	757	474	2	4	...	...	11	5	...	...	...	...	552	683	7·3	9·8	54·7	48·1	0·8	169·2	26·9	33·2	36·2
Madras	Madras	7,949	6,851	28	11	4	1	554	524	...	...	1	...	5,614	5,819	16·1	16·9	15·2	37·2	2·8	118·0	36·1	37·4	27·9
Madura	Madura	333	252	3	2	13	1	16	1	...	...	1	...	922	719	15·1	1·1	3·6	11·2	0·7	63·4	45·1	48·7	56·7
	Dindigul	76	52	1	1	1	2	2	1	...	...	...	...	78	81	21·06	1·01	1·3	9·9	0·6	46·3	28·7	18·1	31·7
Malabar	Tellicherry	34	18	...	2	4	...	4	2	1	...	...	1	149	132	9·4	0·09	3·9	2·5	0·6	30·3	21·5	29·4	28·9
	Calicut	62	76	1	...	1	...	...	...	...	...	...	...	341	295	8·7	3·4	2·1	2·8	0·04	30·6	17·3	29·7	22·9
	Palghaut	78	51	...	1	4	...	4	3	2	1	...	...	301	236	12·06	1·3	9·2	4·1	0·4	44·8	39·6	35·3	35·9
	Cochin	28	18	1	...	3	...	2	1	...	...	...	...	112	100	0·3	0·2	3·1	3·3	0·5	22·9	29·2	26·7	26·3
	Cannanore	9	9	...	...	...	...	2	...	...	...	...	...	142	117	11·06	0·03	2·4	0·5	0·06	22·4	17·2	21·6	28·2

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Return showing the Births and Deaths Registered in the Municipalities of the Madras Presidency during the Year 1877—(Continued).

Districts.	Municipal Towns.	Population.	Births.							Deaths.													
			Class.				Total Births.			Causes of Death.													
														Total Deaths.			Cholera.		Small-pox.		Fevers.		
			Christians.	Mahomedans.	Hindus.	Other Classes.	Males.	Females.	Total.	Christians.	Mahomedans.	Hindus.	Other Classes.	M.	F.	Total.	M.	F.	M.	F.	M.	F.	
Neilgherries ...	Ootacamund	9,982	137	58	172	...	191	176	367	258	95	394	...	391	356	747	58	39	61	64	83	82	
	Coonoor	3,058	33	7	46	...	45	41	86	72	23	377	...	272	200	472	30	21	13	17	41	38	
Nellore ...	Nellore	29,922	16	61	400	...	250	227	477	36	308	2,648	...	1,825	1,167	2,992	256	175	128	96	106	82	
North Arcot ...	Vellore	38,022	33	162	656	...	451	400	851	80	433	2,295	...	1,453	1,355	2,808	478	407	42	49	151	137	
	Wallajapett	12,103	1	31	321	...	184	169	353	...	79	901	...	519	461	980	87	58	9	8	12	15	
Salem ...	Salem	50,012	29	105	1,048	...	640	542	1,182	197	178	1,951	...	1,257	1,069	2,326	263	183	134	140	150	126	
South Arcot ...	Cuddalore	40,290	33	50	1,070	...	589	564	1,153	24	55	1,096	...	633	542	1,175	107	115	55	42	81	65	
	Chellumbram	15,519	...	15	204	...	112	107	219	...	21	283	1	142	163	305	33	35	5	13	28	29	
South Canara...	Mangalore	29,712	159	70	371	1	305	296	601	221	262	988	1	808	664	1,472	30	24	389	329	56	27	
Tanjore ...	Tanjore	52,175	133	63	1,257	...	760	693	1,453	138	63	2,136	...	1,224	1,113	2,337	279	218	170	182	130	95	
	Combaconum	44,444	31	37	1,321	...	711	678	1,389	51	55	2,114	...	1,126	1,094	2,220	128	129	114	129	161	175	
	Mayaveram	21,165	12	8	360	...	192	188	380	14	5	347	...	184	182	366	13	13	21	21	25	18	
	Negapatam	48,525	92	374	548	...	579	435	1,014	110	614	1,333	...	1,049	1,008	2,057	234	210	190	172	98	121	
	Mannargoody	17,703	1	17	553	8	292	287	579	7	9	610	1	333	294	627	67	58	53	46	21	20	
Tinnevelly ...	Tinnevelly	21,044	5	25	649	...	376	303	679	4	32	966	...	541	461	1,002	93	87	11	8	29	16	
	Palamcottah	17,945	61	40	564	...	326	339	665	51	55	638	...	418	326	744	45	41	34	22	19	18	
	Tuticorin	10,565	183	29	180	...	186	206	392	327	55	1,010	...	801	591	1,392	418	238	53	50	41	39	
Trichinopoly ...	Trichinopoly	76,530	221	215	1,123	...	766	793	1,559	308	273	2,380	...	1,518	1,443	2,961	242	199	240	241	97	104	
	Streerangam	18,655	1	...	279	...	161	119	280	2	1	1,054	...	561	496	1,057	53	56	67	84	32	31	
Vizagapatam ...	Vizagapatam	32,191	16	85	835	...	544	392	936	40	89	1,309	...	702	736	1,438	182	156	1	...	106	97	
	Bimlipatam	8,744	6	9	157	...	82	90	172	4	8	287	...	145	154	299	42	35	...	...	18	16	
	Vizianagaram	20,169	1	9	581	..	293	298	591	1	38	790	...	453	376	829	170	149	2	...	164	137	
	Total ...	1,604,188	2,958	4,846	35,946	21	23,063	20,708	43,771	5,067	11,969	93,518	18	58,735	51,837	110,888	10,621	9,010	5,871	5,721	7,252	6,797	

Return showing the Births and Deaths Registered in the Municipalities of the Madras Presidency during the Year 1877—(Continued).

Districts.	Municipal Towns.	Deaths—(*Continued*). Causes of Death—(*Continued*). Bowel-complaints. M.	Bowel-complaints. F.	Injuries. Suicides. M.	Suicides. F.	Wounds. M.	Wounds. F.	Accidents. M.	Accidents. F.	Snake-bite. M.	Snake-bite. F.	Killed by Wild Beasts. M.	Killed by Wild Beasts. F.	All other Causes. M.	All other Causes. F.	Ratio per 1,000 of Population. Cholera.	Small-pox.	Fevers.	Bowel-complaints.	Injuries.	Total Deaths.	Total Births.	Average Ratio for 3 Years ending 1876 per 1,000 of Population. Total Deaths.	Total Births.
Neilgherries	Ootacamund ...	46	29	1	...	2	...	4	...	...	...	...	...	136	142	9·7	12·5	16·5	7·5	0·7	74·8	36·7	30·1	36·9
	Coonoor	141	86	...	...	...	...	...	...	...	...	...	...	48	37	16·6	9·8	25·8	74·2	...	154·9	28·1	40·1	30·9
Nellore ...	Nellore	504	329	6	6	9	3	8	2	4	...	...	...	804	474	14·4	7·4	6·2	27·8	1·2	99·9	15·9	26·7	23·2
North Arcot	Vellore	277	246	1	2	1	...	1	2	...	...	...	...	502	512	23·2	2·3	7·5	13·7	0·1	73·8	22·3	36·9	32·5
	Wallajapett ...	144	105	...	...	...	...	2	5	1	...	...	1	264	269	11·9	1·4	6·2	20·5	0·7	80·9	29·1	34·4	34·9
Salem ...	Salem	266	213	1	...	3	4	3	10	1	...	...	...	436	393	8·9	5·4	5·5	9·5	0·4	46·5	23·6	29·4	33·3
South Arcot	Cuddalore	150	121	1	...	2	...	4	1	4	1	...	...	229	197	5·5	2·4	3 6	6·7	0·3	29·1	28·6	21·7	27·8
	Chellumbrâm ...	16	16	1	...	1	...	15	10	2	...	...	...	41	60	4·3	1·1	3·6	2·06	1·8	19·6	14·1	19·1	17·5
South Canara ...	Mangalore	86	73	1	2	...	...	3	...	1	...	...	...	242	209	1·8	24·1	2·7	5·4	0·2	49·5	20·2	28·7	20·1
Tanjore ...	Tanjore	294	304	1	...	2	...	1	2	1	...	...	...	346	312	9·5	6·7	4·3	11·4	0·1	44·7	27·8	29·7	29·8
	Combaconum ...	269	229	1	...	...	...	5	6	1	...	...	...	447	426	5·7	5·4	7·5	11·2	0·2	49·9	31·2	36·1	32·4
	Mayaveram ...	20	21	...	...	...	...	...	...	...	...	...	...	105	109	1·2	1·9	2·03	1·8	...	17·2	17·9	26·6	29·0
	Negapatam ...	171	145	1	2	2	...	8	2	1	2	...	...	344	354	9·1	7·4	4·5	6·5	0·3	42·8	20·8	30·2	28·1
	Mannargoody ...	56	48	1	...	...	1	2	2	...	...	...	...	133	124	7·06	5·5	2·3	5·5	0·3	35·4	32·7	27·7	30·7
Tinnevelly ...	Tinnevelly	104	101	2	3	...	...	6	2	...	...	...	...	296	244	8·5	0·9	2·1	9·7	0·6	47·6	32·2	42·8	36·6
	Palamcottah ...	99	82	...	1	1	...	...	...	...	...	...	...	220	162	4·9	3·1	2·06	10·0	0·1	41·4	37·0	34·2	37·8
	Tuticorin	145	157	...	1	2	1	3	2	...	...	...	...	139	103	62·0	9·7	7·5	28·5	0·8	131·7	37·1	58·9	49·9
Trichinopoly ...	Trichinopoly ...	620	494	1	2	1	1	8	4	...	...	...	...	309	398	5·7	6·2	2·6	14·5	0·2	38·6	20·3	26·2	24·8
	Streerangam ...	167	113	...	...	...	2	...	1	...	1	...	...	242	208	5·8	8·0	3·3	15·01	0·2	56·6	15·0	26·3	19·4
Vizagapatam ...	Vizagapatam ...	44	44	1	4	1	...	5	2	...	...	...	...	362	433	10·4	0·03	6·3	2·7	0·4	44·6	29·0	30·6	31·3
	Bimlipatam ...	24	30	...	...	...	...	3	...	...	...	...	...	58	73	8·8	...	3·8	6·1	0·3	34·1	19·6	28·8	30·7
	Vizianagaram ...	12	20	...	1	...	...	12	2	...	...	...	...	93	67	15·8	0·09	14·9	1·5	0·7	41·1	29·3	31·9	31·1
	Total ...	16,737	13,283	64	59	87	33	744	639	26	8	3	4	17,335	16,278	12·2	7·2	8·7	18·7	1·0	69·1	27·2	31·3	28·6

APPENDIX III.

VACCINATION RETURNS.

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A—VACCINE DEPARTMENT.

STATEMENT No. I. *showing Particulars of Vaccination in the Madras Presidency during the Year* 1877-78.

Number.	Circles and Districts.	Establishment.	Population of District or Circle according to Census of 1871.	Average Population per Square Mile.	Average Number of Vaccinators employed throughout the Season.	Total Number of Persons Vaccinated.			Average Number of Persons Vaccinated by each Vaccinator.	Primary Vaccination. Total.	Primary Vaccination. Successful. Under one Year.	Primary Vaccination. Successful. Over one and under six Years.	Primary Vaccination. Successful. Total of all Ages over six Years.	Re-vaccination. Total.	Re-vaccination. Successful.	Percentage of Successful Cases. Primary.	Percentage of Successful Cases. Re-vaccination.	Persons successfully Vaccinated per 1,000 of Population.	Average Annual Number of Persons successfully Vaccinated during previous five Years. Number.	Average Annual Number of Persons successfully Vaccinated during previous five Years. Ratio per 1,000.	Average Annual Number of Deaths from Small-pox during previous five Years. Number.	Average Annual Number of Deaths from Small-pox during previous five Years. Ratio per 1,000.
1	2	3	4	5	6	7			8	9	10	11	12	13	14	15	16	17	18	19	20	21
						Males.	Females.	Total.														
1	Vaccine Depôt, and Madras District.	Permanent	397,552	14,724	28	64,519	51,816	116,335	4,154	112,714	7,274	...	42,764	3,621	1,557	91·09	86·64	129	22,337	59	633	2
2	Chingleput District.	Permanent ...	900,857	344	13	8,671	8,199	16,870	1,220	16,870	1,149	5,778	6,661	...	...	93·61	...	...	...	...	...	...
	Do. ...	Temporary ...	...	...	4	2,959	2,960	5,919	1,479	5,919	351	1,586	2,525	...	...	75·38	...	...	...	...	...	...
	Do. ...	Red Hills Famine Relief-Camp.	...	...	1	2,309	2,518	4,827	4,827	4,585	613	...	3,697	242	192	94	79·34	...	...	...	...	...
		Total ...	900,857	344	18	13,939	13,677	27,616	1,534	27,374	2,113	7,364	12,883	242	192	81·68	79·33	25	9,572	10	1,386	2
3	Chittoor Circle ...	Permanent ...	1,326,292	254	21	14,839	12,951	27,790	1,323	27,760	1,582	9,566	14,980	30	27	94·	90·	19	8,021	6	1,919	2
4	Vellore Circle ...	Permanent ...	638,861	391	8	12,367	15,465	27,832	3,479	27,819	1,399	6,249	18,610	13	7	94·34	53·84	...	...	...	...	...
	Do. ...	Temporary ...	...	..	2	1,887	1,950	3,837	1,918	3,837	142	1,160	2,066	...	...	87·77	...	...	...	...	...	...
	Do. ...	Zemindari, Arnee Jaghire.	...	...	1	572	477	1,049	1,049	1,049	50	344	639	...	...	98·47	..	...	...	...	...	...
		Total ...	638,861	391	11	14,826	17,892	32,718	2,974	32,705	1,591	7,753	21,315	13	7	93·74	53·84	48	7,067	11	1,082	1
5	Cuddalore Circle.	Permanent ...	1,101,324	326	13	6,047	5,237	11,284	868	11,274	1,069	5,668	3,406	10	7	89·9	70·	9	10,950	9	1,750	2
6	Virdachellum Circle	Permanent ...	598,684	382	8	2,701	2,563	5,264	658	5,234	341	...	4,133	30	12	84·9	40·	7	4,489	7	778	1
7	Trichinopoly District.	Permanent ...	1,112,607	310	16	7,631	7,236	14,867	929	14,867	1,287	...	10,917	...	...	95·90	...	...	...	...	...	...
	Do. ...	Temporary ...	...	...	3	330	418	748	249	748	8	...	509	...	...	91·82	...	...	...	...	...	...
		Total ...	1,112,607	310	19	7,961	7,654	15,615	716	15,615	1,295	...	11,426	...	...	81·46	...	11	15,324	14	800	·71

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8	Tanjore Circle ...	Permanent	969,738	436	18	8,446	7,356	15,799	877	15,799	1,492	...	13,336	...	...	96·93	...	15	8,463	6	991	1
9	Negapatam Circle.	Permanent	819,981	540	12	5,990	4,929	10,919	909	10,510	649	...	9,038	409	258	92·16	63·08	12	7,814	9	987	1
10	Madura Circle ... Do. ...	Permanent .. ... Private Vaccinators.	1,246,798 ...	255 ...	33 1	16,767 20	15,902 15	32,669 35	989 35	32,635 35	4,443 21	14,008 ...	11,171 14	34 ...	17 ...	90·76 100·	50· ...	... ...	... ...	... ...	... ...	... ...
		Total ...	1,246,798	255	34	16,787	15,917	32,704	962	32,670	4,464	14,008	11,185	34	17	90·77	50·	24	22,301	18	385	·22
11	Dindigul Circle ... Do. ...	Permanent ... ... Hospital Assistant as Vaccinator at Palni Hills.	954,965 ...	270 ...	18 ...	13,072 54	13,225 59	26,297 113	1,460 113	26,263 113	4,768 43	10,296 ...	10,418 29	34 ...	20 ...	96·98 63·71	58·82 ...	... ...	... ...	... ...	... ...	... ...
		Total ...	954,965	270	18	13,126	13,284	26,410	1,579	26,376	4,806	10,296	10,442	34	20	96·84	58·82	26	8,888	9	1,517	1
12	Tinnevelly Circle.	Permanent	1,181,111	330	17	8,624	7,651	16,275	957	16,269	1,736	8,002	5,114	6	2	91·27	33·33	13	11,466	9	1,852	2
13	Shermadavi Circle.	Permanent	463,294	372	8	3,567	3,011	6,578	822	6,558	620	...	4,921	20	15	84·41	75·	12	4,752	10	628	1
14	Cuddapah Circle...	Permanent	784,780	169	21	7,306	5,386	12,692	604	12,692	416	4,807	5,655	...	...	81·76	...	13	22,041	28	541	·7
15	Madanapalli Circle.	Permanent	550,169	169	15	4,319	3,299	7,618	692	7,547	289	1,802	3,519	71	46	88·01	66·28	10	2,529	5	464	·84
16	Kurnool District...	Permanent	926,766	120	12	2,599	1,748	4,347	362	4,336	461	...	3,236	11	11	86·	100·	4	2,736	3	987	1
17	Bellary Circle ...	Permanent	395,172	86	13	3,429	3,299	6,728	517	6,699	2,154	...	3,007	29	17	89·52	80·	13	9,187	23	369	·93
18	Pennacondah Circle.	Permanent	376,715	130	3	1,316	1,134	2,450	612	2,424	663	...	1,329	26	9	81·67	·09	5	2,927	8	373	·99
19	Ghooty Circle ...	Permanent	609,982	163	6	3,028	2,854	5,882	980	5,854	2,399	...	2,774	28	24	87·9	85·7	8	4,006	6	751	1
20	Salem Circle ...	Permanent	1,363,087	285	17	16,904	17,959	34,863	2,050	34,770	623	9,039	23,858	93	83	96·40	89·24	24	9,976	7	2,319	1
21	Ossoor Circle ... Do. ...	Permanent ... ... Temporary	553,896 ...	196 ...	15 2	7,859 876	8,156 733	16,015 1,609	1,187 804	15,830 1,609	862 29	... ...	13,466 1,382	185 ...	148 ...	89· 87·	80· ...	... ...	... ...	... ...	... ...	... ...
		Total ...	553,896	196	17	8,735	8,889	17,624	1,036	17,439	891	...	14,848	185	148	90·25	80·	28	7,219	11	658	1
22	Neilgherry Circle.	Permanent	36,461	36	2	1,642	1,263	2,905	1,452	2,788	254	...	2,301	117	79	87·95	76·36	72	...	...	14	·38
23	North Coimbatore Circle.	Permanent	795,610	234	13	12,304	11,176	23,480	1,806	23,406	3,326	...	17,980	74	62	96·52	92·54	...	...	...	...	...
	Do. ...	Temporary ...	...	...	2	2,754	2,799	5,553	2,776	5,500	328	...	4,766	53	42	97·19	87·05	...	...	...	...	...
		Total ...	795,610	234	15	15,058	13,975	29,033	1,946	28,906	3,654	...	22,746	127	104	91·33	81·81	...	...	...	...	...

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A—VACCINE DEPARTMENT.

STATEMENT No. I. *showing Particulars of Vaccination in the Madras Presidency during the Year* 1877-78—(Continued).

Number.	Circles and Districts.	Establishment.	Population of District or Circle according to Census of 1871.	Average Population per Square Mile.	Average Number of Vaccinators employed throughout the Season.	Total Number of Persons Vaccinated.			Average Number of Persons Vaccinated by each Vaccinator.	Primary Vaccination. Total.	Primary Vaccination. Successful. Under one Year.	Primary Vaccination. Successful. Over one and under six Years.	Primary Vaccination. Successful. Total of all Ages over six Years.	Re-vaccination. Total.	Re-vaccination. Successful.	Percentage of Successful Cases. Primary.	Percentage of Successful Cases. Re-vaccination.	Persons successfully Vaccinated per 1,000 of Population.	Average Annual Number of Persons successfully Vaccinated during previous five Years. Number.	Average Annual Number of Persons successfully Vaccinated during previous five Years. Ratio per 1,000.	Average Annual Number of Deaths from Small-pox during previous five Years. Number.	Average Annual Number of Deaths from Small-pox during previous five Years. Ratio per 1,000.
1	2	3	4	5	6	7			8	9	10	11	12	13	14	15	16	17	18	19	20	21
						Males.	Females.	Total.														
24	South Coimbatore Circle.	Permanent ...	922,156	321	20	18,861	18,244	37,105	1,855	37,105	4,912	...	30,186	...	...	97·26	...	38	26,921	16	1,382	·8
25	Malabar District.	Permanent ...	2,138,933	344	11	8,096	2,624	10,720	974	10,720	45	...	9,527	...	...	95·72	...	...	...	...	...	...
	Do. ...	Temporary ...	...	...	5	1,178	626	1,804	234	1,804	3	...	1,621	...	...	96·43	...	...	...	...	...	...
	Do. ...	Private	...	...	1	15	7	22	22	22	...	...	22	...	...	100·	...	...	...	...	...	...
		Total ...	2,138,933	344	17	9,289	3,257	12,546	738	12,546	48	...	11,170	...	...	89·41	...	5	14,165	7	6,291	3
26	South Canara District.	Permanent ...	888,650	202	20	18,626	13,747	32,373	1,541	30,678	564	...	27,338	1,695	1,324	86·18	78·11	...	...	...	...	...
	Do. ...	Temporary ...	...	...	10	5,388	4,379	9,767	976	9,579	129	...	8,358	188	147	88·58	78·19	...	...	...	...	...
	Do. ...	Hospital Assistant as Vaccinator, Amindevi Islands.	...	...	...	105	95	200	200	200	29	...	170	...	...	99·5	...	...	...	...	...	...
		Total ...	888,650	202	30	24,119	18,221	42,340	1,411	40,457	722	...	35,866	1,883	1,471	90·43	78·01	43	16,428	18	466	·52
27	Nellore Circle ...	Permanent ...	703,867	180	13	12,988	12,411	25,399	1,954	24,404	855	...	22,315	995	879	94·14	88·34	...	...	...	...	...
	Do. ...	Temporary	...	...	6	3,014	2,867	5,881	980	5,833	95	...	5,238	48	40	91·42	83·33	...	...	...	...	...
	Do. ...	Zemindari, Vencatagherry.	...	...	2	1,053	879	1,932	966	1,928	29	...	1,774	4	3	93·51	75	...	...	...	...	...
		Total ...	703,867	180	21	17,055	16,157	33,212	1,581	32,165	979	...	29,327	1,047	922	91·25	88·06	44	14,659	20	2,176	3
28	Ongole Circle ...	Permanent ...	648,022	197	22	6,536	5,776	12,312	559	12,312	591	4,705	6,073	...	...	92·	...	...	...	...	...	...
	Do. ...	Temporary ...	...	...	8	771	659	1,430	178	1,430	58	626	543	...	...	93·	...	...	...	...	...	...
	Do. ...	Private	...	...	1	222	192	414	414	414	269	100	45	...	...	100·	...	...	...	...	...	...
		Total ...	648,022	197	31	7,529	6,627	14,156	456	14,156	918	5,431	6,661	...	...	91·90	...	20	6,499	10	1,234	2

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29	Masulipatam Circle	Permanent	738,047	202	11	3,790	3,193	6,991	1,061	6,830	713	...	6,117	161	112	89·20	17·18	...	...	...	...	...
	Do.	Temporary	...	...	7	3,676	3,291	6,967	995	6,409	569	...	5,840	558	433	86·05	77·59	...	...	...	...	...
		Total ...	738,047	202	18	7,475	6,483	13,958	775	13,239	1,282	...	11,957	719	546	94·84	75·98	19	7,589	5	720	·97
30	Guntoor Circle ...	Permanent	660,106	159	7	5,779	5,250	11,029	1,576	10,996	921	...	9,291	33	27	93·	82·	15	...	...	714	1
31	Cocanada Circle ...	Permanent	834,948	193	16	6,694	4,802	11,496	1,305	11,496	590	...	9,718	...	...	89·67	...	...	...	...	...	...
	Do. ...	Zemindary, Pittapur.	...	...	2	701	464	1,165	582	1,165	23	...	998	...	...	87·	...	...	...	...	...	...
		Total ...	834,948	193	18	7,395	5,266	12,661	703	12,661	613	...	10,716	...	...	89·47	...	14	5,517	7	718	·86
32	Ellore Circle ...	Permanent	694,927	216	7	2,997	2,843	5,840	834	5,840	323	...	4,678	...	...	85·06	...	7	4,015	6	1,034	1
33	Vizagapatam Circle	Permanent	836,828	739	24	4,644	4,472	9,116	381	9,083	712	3,563	4,648	33	32	98·28	96·96	11	16,569	19	804	·45
34	Vizianagram Circle	Permanent	987,967	1,076	18	6,625	6,364	12,989	590	12,944	737	...	12,070	45	44	98·94	97·77	12	8,860	10	...	...
35	Jeypore Hill Tracts	Permanent	314,498	37	6	1,040	647	1,687	281	1,687	104	994	293	...	...	82·45	...	...	...	...	...	...
	Do. ...	Zemindary	...	...	8	1,198	769	1,967	163	1,967	118	1,167	337	...	...	82·46	...	...	...	...	...	...
		Total ...	314,498	37	14	2,238	1,416	3,654	261	3,654	222	2,161	630	...	...	82·45	...	10	2,223	7	...	...
36	Chetterpore Circle	Permanent	784,856	221	18	4,874	3,427	8,301	461	8,301	48	...	7,319	...	...	91·25	...	9	5,353	4	1,263	1
37	Chicacole Circle ...	Permanent	566,863	476	10	2,107	1,885	3,992	399	3,992	163	...	3,829	...	...	85·1	...	7			130	·22
38	Ganjam Hill Tracts	Permanent	131,112	...	6	1,144	982	2,126	355	2,126	172	...	1,844	...	...	97·53	...	15	3,210	24	...	...
		Total of the Circles and Districts.	...	...	605	367,836	324,638	692,474	1,145	683,578	53,608	88,960	428,358	8,896	5,677	83·52	63·81	...	...	...	...	...

Military Cantonments.

1	Bangalore ...	......	81,810	...	2	773	626	1,399	699	1,335	529	...	712	64	39	94·22	68·42	15	1,022	12	...	...
2	Secunderabad ...	......	52,448	...	2	1,795	1,800	3,595	1,797	3,595	2,630	...	776	...	...	91·41	...	64	2,016	38	...	...
3	Kamptee	......	47,244	...	2	988	808	1,796	898	1,796	776	...	798	...	...	87·73	...	33	908	19	...	...
		Total ...	181,512	...	6	3,556	3,234	6,790	1,132	6,726	3,935	...	2,286	64	39	92·49	60·93	8	...	...	...	...

Railway Apothecaries.

1	Madras Railway Lines.	......	...	...	...	8	2	10	...	10	1	...	6	...	...	70	...	...	...	...	...	...
		Total ...	...	...	...	8	2	10	...	10	1	...	6	...	...	70	...	...	...	...	...	...

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A—VACCINE DEPARTMENT.

STATEMENT No. I. *showing Particulars of Vaccination in the Madras Presidency during the Year* 1877-78—(Continued).

Number.	Circles and Districts.	Establishment.	Population of District or Circle according to Census of 1871.	Average Population per Square Mile.	Average Number of Vaccinators employed throughout the Season.	Total Number of Persons Vaccinated.			Average Number of Persons Vaccinated by each Vaccinator.	Primary Vaccination.				Re-vaccination.		Percentage of Successful Cases.		Persons successfully Vaccinated per 1,000 of Population.	Average Annual Number of Persons successfully Vaccinated during previous five Years.		Average Annual Number of Deaths from Small-pox during previous five Years.	
										Total.	Successful.											
						Males.	Females.	Total.			Under one Year.	Over one and under six Years.	Total of all Ages over six Years.	Total.	Successful.	Primary.	Re-vaccination.		Number.	Ratio per 1,000.	Number.	Ratio per 1,000.
1	2	3	4	5	6	7			8	9	10	11	12	13	14	15	16	17	18	19	20	21
						Medical Subordinates.																
1	Presidency, Centre and Northern Districts.	......	...	...	...	5,076	1,137	6,213	...	6,213	165	...	2,666	...	...	52·30	...	...	...	...	...	...
2	Southern Division, Malabar and South Canara.	......	...	...	...	12,852	1,842	14,694	...	14,694	406	...	10,863	...	...	79·76	...	...	...	...	...	...
3	Mysore and Ceded Districts.	......	...	...	...	2,351	509	2,860	...	2,860	175	...	1,466	...	...	68·37	...	...	...	...	...	...
4	Hyderabad Subsidiary Force.	......	...	...	...	885	691	1,576	...	1,576	890	...	409	...	...	86·12	...	...	...	...	...	...
5	Nagpore Force ...	......	...	...	...	1,917	1,159	3,076	...	3,076	1,045	...	1,294	...	...	76·31	...	...	...	...	...	...
6	Pegu Division ...	......	...	...	...	149	16	165	...	165	5	...	54	...	...	36·87	...	...	...	...	...	...
		Total ...	...	...	...	23,230	5,354	28,584	...	28,584	2,686	...	16,752	...	...	68·	...	...	...	...	...	...
						Municipalities.																
1	Chicacole ...	Ganjam District ...	15,587	...	1	177	70	247	247	247	10	...	186	...	...	79·3	...	12	99	6	22	1
2	Berhampore ...	Do. ...	21,670	...	1	149	133	282	282	282	27	135	68	...	...	81·56	...	10	162	7	18	·59
3	Vizagapatam ...	Vizagapatam District.	32,191	...	1	216	25	241	241	241	1	...	212	...	...	88·	...	7	751	23	53	2
4	Bimlipatam ...	Do. ...	8,744	...	1	198	214	412	412	358	11	169	163	54	42	96·	78·	43	362	41	9	1
5	Vizianagram ...	Do. ...	20,169	...	1	298	287	585	585	584	35	...	549	1	...	98·08	...	27	628	31	7	·34
6	Cocanada ...	Godavery District ...	17,839	...	2	1,031	768	1,799	899	1,710	93	...	1,266	89	51	88·	57·	78	767	214	11	·61
7	Rajahmundry ...	Do. ...	19,738	...	1	619	381	1,000	1,000	1,000	89	...	844	...	...	93·	...	47	718	36	11	·55
8	Ellore	Do. ...	25,487	...	1	456	495	951	951	906	29	...	754	45	33	87·	78·	30	543	21	43	2
9	Masulipatam ...	Kistna District ...	36,188	...	1	695	620	1,315	1,315	1,318	108	...	1,207	2	...	97·86	...	39	815	23	14	·38
10	Guntoor ...	Do. ...	18,033	...	1	792	653	1,445	1,445	1,443	59	...	914	2	2	67·	100·	54	781	48	22	1

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11	Nellore	Nellore District ...	29,922	...	1	1,245	1,107	2,352	2,352	1,854	66	...	1,763	498	406	98·65	81·52	74	1,024	30	16	·50
12	Conjeveram ...	Chingleput District..	37,327	...	1	735	597	1,332	1,332	1,332	151	558	544	...	...	91·06	...	33	4,177	112	75	2
13	Cuddalore ...	South Arcot District.	40,290	...	1	682	532	1,214	1,214	1,214	21	511	558	...	...	89·7	...	26	174	4	32	·70
14	Chedambaram ...	Do. ...	15,519	...	1	290	268	558	558	558	20	...	461	...	...	86·02	...	30	114	7	9	·57
15	Trichinopoly ...	Trichinopoly District.	76,530	...	4	1,275	1,110	2,385	596	1,896	618	...	887	489	424	80·	86·	25	2,817	36	81	1
16	Sreerungam ...	Do. ...	18,655	...	1	223	248	471	471	471	79	...	277	...	...	95·69	...	19	563	30	15	·80
17	Tanjore	Tanjore District ...	52,175	...	2	733	422	1,155	577	1,155	154	...	925	...	...	94·48	...	20	1,176	22	52	·99
18	Combaconum ...	Do. ...	44,414	...	1	520	502	1,022	1,022	1,022	220	...	571	...	...	89·88	...	15	1,114	21	62	1
19	Mayaveram ...	Do. ...	21,165	...	1	166	197	362	362	362	116	...	216	...	...	91·71	...	6	664	14	21	·98
20	Negapatam ...	Do. ...	48,525	...	5	461	438	899	179	889	170	...	615	10	2	88·30	·20	17	623	14	38	·78
21	Munnargoody ...	Do. ...	17,703	...	1	301	251	552	552	552	49	...	471	...	...	87·56	...	24	454	21	28	1
22	Madura	Madura District ...	51,987	...	3	1,854	1,157	3,011	1,003	2,868	948	851	779	143	135	85·61	94·40	52	2,504	47	107	2
23	Dindigul ...	Do. ...	12,865	...	1	3,378	3,824	7,202	7,202	7,202	281	1,887	4,684	...	...	95·14	...	532	1,335	103	11	·85
24	Tinnevelly ...	Tinnevelly District.	21,044	...	2	262	270	532	266	482	66	201	215	50	...	91·72	...	22	490	23	45	2
25	Palamcottah ...	Do. ...	17,945	...	2	194	244	438	219	324	58	125	107	114	87	87·96	76·31	21	889	22	36	2
26	Tuticorin ...	Do. ...	10,565	...	1	481	499	980	980	976	90	...	765	4	4	76·	100·	70	777	73	31	3
27	Kurnool ...	Kurnool District ...	25,579	16,579	1	148	115	263	263	183	40	86	16	80	22	76·	26·	6	812	12	29	1
28	Cuddapah ...	Cuddapah District.	16,275	...	1	540	296	836	836	836	63	...	455	...	...	88·85	...	32	230	14	7	·43
29	Bellary ...	Bellary District ...	51,766	...	3	897	1,032	1,929	643	1,904	777	...	740	25	...	78·38	...	51	1,115	22	61	1
30	Adoni ...	Do. ...	22,723	...	1	743	486	1,229	1,229	1,229	635	...	418	...	...	85·3	...	46	1,002	43	45	2
31	Ghooty ...	Do. ...	6,730		No Vaccinator was employed in this Municipality.																	
32	Anantapur ...	Do. ...	4,918	...	1	185	170	355	355	355	190	...	156	...	...	97·4	...	70	69	14	1	·20
33	Vellore ...	North Arcot District.	38,022	...	2	3,990	4,202	8,192	4,096	8,189	649	2,283	5,259	3	2	99·96	66·66	215	886	24	42	1
34	Wallajapet ...	Do. ...	12,103	...	1	293	309	602	602	602	23	361	128	...	...	85·	...	42	133	11	29	2
35	Salem ...	Salem District ...	50,012	...	2	1,017	927	1,944	972	1,928	436	...	1,223	16	9	86·04	56·25	33	1,337	27	103	2
36	Coimbatore ...	Coimbatore District.	35,310	...	1	805	785	1,590	1,590	1,528	638	...	698	62	62	87·43	100·	39	1,362	38	31	·87
37	Erode	Do. ...	10,201	...	1	189	167	356	356	356	11	...	251	...	...	86·75	...	25	170	16	15	1
38	Caroor	Do. ...	9,378	...	1	198	154	352	352	352	8	...	311	...	...	95·44	...	33	...	...	1	·10
39	Mtetapaliem ...	Do. ...	4,144		No Vaccinator was employed in this Municipality.																	
40	Ootacamund ...	Neilgherry District.	9,982	...	1	562	483	1,045	1,045	973	189	678	...	72	32	89·10	44·4	90	726	72	6	·60
41	Coonoor ...	Do. ...	3,058	...	1	511	325	836	836	711	137	292	239	125	95	98·95	76·	24	489	15	1	·32
42	Mangalore ...	South Canara District	29,712	...	2	1,367	893	2,260	1,130	2,096	230	...	1,691	164	64	85·	51·2	67	2,731	91	54	2
43	Tellicherry ...	Malabar District ...	20,504	...	1	558	150	708	708	691	3	66	486	17	2	78·	11·	27	896	43	81	4
44	Calicut	Do. ...	47,962	...	2	984	309	1,293	646	1,293	26	265	826	...	...	86·3	...	23	1,546	32	156	3
45	Palghaut ...	Do. ...	30,752	...	1	506	269	775	775	775	3	373	236	...	...	79·	...	20	1,315	42	45	1
46	Cochin	Do. ...	13,840	...	1	400	255	655	655	655	62	217	165	...	...	67·78	...	32	853	61	113	8
47	Cannanore ...	Do. ...	31,358	...	1	831	495	1,326	1,326	1,326	116	527	437	...	...	84·76	...	29	7,392	23	66	2
		Total ...	1,604,188	...	64	32,154	27,134	59,288	926	57,223	7,825	9,585	33,731	2,065	1,494	89·37	72·34	33	33,000	20	2,421	1·5
		Grand Total ...	*31,597,872	*226·2	675	426,784	360,362	787,146	...	776,121	68,055	98,545	481,133	11,025	7,210	82·28	65·39	21	346,398	11	37,746	1·19

N.B.—Dispensary vaccination is excluded from this statement and is given separately in Statement No. III.
The number of deaths from small-pox during previous five years was calculated for calendar years.
* Figures taken from the Census Report of 1871.

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A—VACCINE

Statement No. II. *showing the Cost of the Department in the*

Number.	Circles and Districts.	—	Establishment. Inspector of Vaccination and Deputy Sanitary Commissioner.	1st-Class Deputy Inspectors.	2nd-Class Deputy Inspectors.	Vaccination 1st-Class.	Vaccination 2nd-Class.	Probationers.	Peons.	Expen[diture] Pay of Establishment.	Travelling Allowance.	Contingencies.
1	2		3	4	5	6	7	8	9	10	11	12
										RS. A. P.	RS. A. P.	RS. A. P.
1	Madras Presidency	......	1	1	...	...	...	...	...	16,922 8 0	1,402 8 6	176 6 6
2	Madras District and Vaccine Depôt.	Permanent ...	...	1	...	4	12	...	3	3,543 11 5	...	3,631 7 0
3	Chingleput District.	Permanent ...	...	1	...	4	9	...	...	2,772 0 0	...	174 8 9
	Do. ...	Temporary ...	...	...	...	...	4	...	...	261 5 4	...	18 7 11
	Do. ...	Red Hills Famine Relief-Camp.	...	...	...	1	...	...	...	105 0 0	...	...
		Total ...	...	1	...	5	13	...	...	3,138 5 4	...	193 0 8
4	Chittoor Circle.	Permanent ...	...	1	...	6	11	4	1	3,748 0 4	116 10 0	145 8 9
5	Vellore Circle ...	Permanent ...	...	1	...	3	5	2	1	2,159 13 10	355 13 5	261 3 8
	Do. ...	Temporary ...	...	...	...	...	5	...	...	121 6 8	...	...
	Do. ...	Zemindary, Arnee Jaghire.	...	...	...	...	1	...	...	120 0 0	...	...
		Total ...	...	1	...	3	11	2	1	2,401 4 6	355 13 5	261 3 8
6	Cuddalore Circle.	Permanent ...	...	1	...	5	8	...	1	2,956 15 6	...	72 10 6
7	Virdachellum Circle.	Permanent ...	...	...	1	3	3	2	1	1,419 6 10	5 13 0	28 11 6
8	Trichinopoly District.	Permanent ...	...	1	...	5	11	1	1	3,041 1 3	192 5 0	370 4 7
	Do. ...	Temporary ...	...	...	...	...	3	...	...	91 10 8	...	...
		Total ...	...	1	...	5	14	1	1	3,132 11 11	192 5 0	370 4 7
9	Tanjore Circle...	Permanent ...	...	1	...	4	12	2	1	3,198 0 0	28 2 0	112 14 0
10	Negapatam Circle.	Permanent ...	...	1	...	5	6	...	1	2,603 10 10	5 13 0	278 13 9
11	Madura Circle...	Permanent ...	...	1	...	12	20	...	1	6,351 3 9	1 14 0	137 8 7
12	Dindigul Circle.	Permanent ...	...	...	1	6	9	3	...	3,706 13 1	15 7 0	110 7 0
	......	Hospital Assistant as Vaccinator, Palni Hills.	...	...	...	...	...	...	...	55 0 0	...	...
		Total ...	...	...	1	6	9	3	...	3,761 13 1	15 7 0	110 7 0
13	Tinnevelly Circle	Permanent ...	...	1	...	6	10	2	...	3,297 1 1	3 11 0	111 12 0
14	Shermadevi Circle.	Permanent ...	...	...	1	3	4	1	1	1,650 7 8	...	145 11 10
15	Cuddapah Circle.	Permanent ...	...	1	...	7	7	3	1	3,345 10 5	...	83 12 6
16	Madanapally Circle.	Permanent ...	...	1	...	4	7	4	1	2,404 2 3	...	...
17	Kurnool District.	Permanent ...	...	1	...	4	7	2	1	2,708 0 0	26 2 0	156 3 9
18	Bellary Circle ...	Permanent ...	...	1	...	2	11	...	...	2,546 3 2	...	54 0 0
19	Pennacondah Circle.	Permanent ...	...	...	1	4	...	...	...	1,149 2 9	4 0 0	20 8 0
20	Ghooty Circle...	Permanent ...	...	...	1	5	1	...	...	1,460 12 3	505 8 0	103 1 0
21	Salem Circle ...	Permanent ...	...	1	...	6	11	...	1	3,374 3 9	192 4 0	57 7 0

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DEPARTMENT.

Madras Presidency during the Year 1877-78.

diture.	Paid from							
Total Cost.	Imperial Funds.	Provincial Funds.	Local Funds.	Municipalities.	Native States, Zemindars or private Funds.	Total.	Number of all successful Vaccination and Re-vaccination.	Average Cost of each successful case.
13	14	15	16	17	18	19	20	21
RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.		RS. A. P.
18,501 7 0	...	18,501 7 0	...	...	...	18,501 7 0	...	...
7,175 2 5	...	...	...	7,175 2 5	...	7,175 2 5	51,595	0 2 3
2,946 8 9	...	...	2,946 8 9	...	...	2,946 8 9	13,588	0 3 5
279 13 3	...	...	279 13 3	...	...	279 13 3	4,462	0 1 0
105 0 0	...	105 0 0	...	...	...	105 0 0	4,502	0 0 4
3,331 6 0	...	105 0 0	3,226 6 0	...	...	3,331 6 0	22,552	0 2 4
4,009 14 1	...	...	4,009 14 1	...	...	4,009 14 1	26,105	0 2 6
2,776 14 11	321 3 4	...	2,455 11 7	...	...	2,776 14 11	26,265	0 1 9
121 6 8	121 6 8	...	...	...	...	121 6 8	3,868	0 0 7
120 0 0	...	...	...	...	120 0 0	120 0 0	1,083	0 1 9
3,018 5 7	442 10 0	...	2,455 11 7	...	120 0 0	3,018 5 7	30,666	0 1 7
3,029 10 0	...	...	3,029 10 0	...	...	3,029 10 0	10,150	0 4 9
1,458 15 4	...	...	1,458 15 4	...	...	1,458 15 4	4,486	0 5 0
3,603 10 10	...	...	3,603 10 10	...	...	3,603 10 10	12,204	0 4 9
91 10 8	...	...	91 10 8	...	...	91 10 8	517	0 2 10
3,695 5 6	...	...	3,695 5 6	...	...	3,695 5 6	12,721	0 4 7
3,339 0 0	...	...	3,339 0 0	...	...	3,339 0 0	14,838	0 3 7
2,888 5 7	...	...	2,888 5 7	...	...	2,888 5 7	9,945	0 4 8
6,490 10 4	...	...	6,490 10 4	...	...	6,490 10 4	29,689	0 3 6
3,832 11 1	...	...	3,832 11 1	...	...	3,832 11 1	25,492	0 2 5
55 0 0	...	...	55 0 0	...	...	55 0 0	72	0 12 1
3,887 11 1	...	...	3,887 11 1	...	...	3,887 11	25,564	0 2 5
3,412 8 1	...	...	3,412 8 1	...	...	3,412 8 1	14,854	0 3 8
1,796 3 6	...	...	1,796 3 6	...	...	1,796 3 6	5,556	0 5 2
3,429 6 11	...	...	3,429 6 11	...	...	3,429 6 11	10,378	0 5 3
2,404 2 3	...	...	2,404 2 3	...	...	2,404 2 3	5,656	0 6 1
2,890 5 9	840 0 0	...	2,050 5 9	...	...	2,890 5 9	3,708	0 12 5
2,600 3 2	...	...	2,600 3 2	...	...	2,600 3 2	5,178	0 8 0
1,173 10 9	...	...	1,173 10 9	...	...	1,173 10 9	2,001	0 9 5
2,069 5 3	...	572 11 11	1,496 9 4	...	...	2,069 5 3	5,197	0 6 4
3,623 14 9	...	...	3,623 14 9	...	...	3,623 14 9	33,603	0 1 9

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A—VACCINE

STATEMENT No. II. *showing Cost of the Department in the*

Number.	Circles and Districts.	—	Establishment. Inspector of Vaccination and Dy. Sanitary Commissioner.	1st-Class Deputy Inspectors.	2nd-Class Deputy Inspectors.	Vaccination 1st-Class.	Vaccination 2nd-Class.	Probationers.	Peons.	Expen[…] Pay of Establishment.	Travelling Allowance.	Contingencies.
1	2		3	4	5	6	7	8	9	10	11	12
										RS. A. P.	RS. A. P.	RS. A. P.
22	Oossoor Circle...	Permanent ...	...	...	1	3	6	3	1	2,181 10 5	417 0 3	68 10 7
	Do. ...	Temporary* ...	...	...	...	...	3	...	...	...	...	...
		Total ...	...	...	1	3	9	3	1	2,189 10 5	417 0 3	68 10 7
23	Neilgherry Circle.	Permanent ...	...	...	...	2	...	...	...	552 0 0	...	...
24	North Coimbatore Circle.	Permanent ...	...	1	...	2	4	16	1	2,278 1 0	250 4 0	50 7 6
	Do. ...	Temporary ...	...	...	...	...	2	...	...	249 4 8	...	...
		Total ...	...	1	...	2	6	16	1	2,527 5 8	250 4 0	50 7 6
25	South Coimbatore Circle.	Permanent ...	...	1	...	2	5	16	1	2,514 4 6	178 0 0	768 10 0
26	Malabar District	Permanent ...	...	1	...	4	7	...	...	2,440 11 1	163 6 10	103 15 6
	Do. ...	Temporary ...	...	...	...	...	5	...	...	152 2 2	...	...
		Total ...	...	1	...	4	12	...	...	2,592 13 3	163 6 10	103 15 6
27	South Canara District.	Permanent ...	...	1	...	5	7	8	1	3,578 7 10	...	135 12 7
	Do. ...	Temporary ...	...	...	...	...	10	...	...	369 1 2	...	...
	Do. ...	Hospital Assistant as Vaccinator, Amindevi Island.	...	...	...	...	...	...	...	600 0 0	...	...
		Total ...	...	1	...	5	17	8	1	4,547 9 0	...	135 12 7
28	Nellore Circle...	Permanent ...	...	1	...	4	7	4	1	2,774 1 4	305 1 0	88 4 9
	Do. ...	Temporary ...	...	...	...	...	6	...	...	281 9 7	...	...
	Do. ...	Venkatagiri Zemindary.	...	...	...	...	2	...	...	110 0 0	...	...
		Total ...	...	1	...	4	15	4	1	3,165 10 11	305 1 0	88 4 9
29	Ongole Circle ...	Permanent ...	...	1	...	4	7	8	1	2,951 11 8	592 9 0	268 15 1
	Do. ...	Temporary ...	...	...	...	...	6	...	...	300 3 0	...	...
		Total ...	...	1	...	4	13	8	1	3,251 14 8	592 9 0	268 15 1
30	Masulipatam Circle.	Permanent ...	...	1	...	5	4	2	...	2,128 1 4	...	129 0 9
	Do. ...	Temporary ...	...	...	...	2	5	...	...	956 10 2	...	...
		Total ...	...	1	...	7	9	2	...	3,084 11 6	...	129 0 9
31	Guntoor Circle.	Permanent ...	...	1	...	1	11	...	1	2,019 14 11	...	188 13 11
32	Coçanáda Circle.	Permanent ...	...	1	...	5	8	3	1	3,731 2 8	1,074 10 0	365 14 1
	Do. ...	Pithápuram Zemindary.	...	...	...	2	...	...	...	203 14 0	59 9 0	40 0 0
		Total ...	...	1	...	7	8	3	1	3,935 0 8	1,134 3 0	405 14 1
33	Ellore Circle ...	Permanent ...	...	1	...	5	2	...	1	1,937 0 4	...	117 4 6
34	Vizagapatam Circle.	Permanent ...	...	1	...	7	9	8	...	2,731 12 1	171 12 0	1,062 14 0
35	Vizianagram Circle.	Permanent ...	...	...	1	7	11	3	...	2,835 12 8	193 2 11	149 3 5
36	Jeypore Hill Tracts.	Permanent ...	...	1	...	...	6	...	...	1,367 3 9	148 8 0	15 8 10
	Do. ...	Zemindary ...	...	...	...	...	8	...	...	838 2 11	...	...
		Total ...	...	1	...	...	14	...	...	2,205 6 8	148 8 0	15 8 10

* The cost of the temporary Vaccinators in Oossoor

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DEPARTMENT.

Madras Presidency during the Year 1877-78—(Continued).

diture.	Paid from							
Total Cost.	Imperial Funds.	Provincial Funds.	Local Funds.	Municipalities.	Native States, Zemindars or private Funds.	Total.	Number of all successful Vaccination and Re-vaccination.	Average Cost of each successful case.
13	14	15	16	17	18	19	20	21
RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.		RS. A. P.
2,667 5 3	...	...	2,667 5 3	...	...	2,667 5 3	14,476	0 2 8
... ...	...	...	...	...	...	...	1,411	...
2,667 5 3	...	...	2,667 5 3	...	...	2,667 5 3	15,887	0 2 8
552 0 0	...	...	552 0 0	...	...	552 0 0	2,634	0 3 3
2,578 12 6	...	...	2,578 12 6	...	...	2,578 12 6	21,368	0 1 11
249 4 8	...	...	249 4 8	...	...	249 4 8	5,136	0 0 9
2,828 1 2	...	...	2,828 1 2	...	...	2,828 1 2	26,504	0 1 8
3,455 14 6	...	...	3,455 14 6	...	...	3,455 14 6	35,098	0 1 6
2,708 1 5	...	...	2,708 1 5	...	...	2,708 1 5	9,572	0 4 0
152 2 2	...	...	152 2 2	...	...	152 2 2	1,624	0 1 6
2,860 3 7	...	...	2,860 3 7	...	...	2,860 3 7	11,196	0 4 1
3,714 4 5	...	...	3,714 4 5	...	...	3,714 4 5	29,226	0 2 0
369 1 2	...	...	369 1 2	...	...	369 1 2	8,634	0 0 7
600 0 0	...	...	600 0 0	...	...	600 0 0	199	3 0 3
4,683 5 7	...	...	4,683 5 7	...	...	4,683 5 7	38,059	0 1 11
3,167 7 1	...	...	3,167 7 1	...	...	3,167 7 1	24,049	0 2 1
281 9 7	...	...	281 9 7	...	...	281 9 7	5,373	0 0 10
110 0 0	...	...	...	...	110 0 0	110 0 0	1,806	0 0 11
3,559 0 8	...	...	3,449 0 8	...	110 0 0	3,559 0 8	31,228	0 1 10
3,813 3 9	...	...	3,813 3 9	...	...	3,813 3 9	11,369	0 5 4
300 3 0	...	...	300 3 0	...	...	300 3 0	1,227	0 3 10
4,113 6 9	...	...	4,113 6 9	...	...	4,113 6 9	12,596	0 9 2
2,257 2 1	...	...	2,257 2 1	...	...	2,257 2 1	6,942	0 5 3
956 10 2	...	...	956 10 2	...	...	956 10 2	6,842	0 2 7
3,213 12 3	...	...	3,213 12 3	...	...	3,213 12 3	13,785	0 3 9
2,208 12 10	...	...	2,208 12 10	...	...	2,208 12 10	10,239	0 3 5
5,171 10 9	...	1,084 0 0	4,087 10 9	...	...	5,171 10 9	10,308	0 8 0
303 7 0	...	...	...	...	303 7 0	303 7 0	1,021	0 4 9
5,475 1 9	...	1,084 0 0	4,087 10 9	...	303 7 0	5,475 1 9	11,329	0 7 9
2,054 4 10	...	...	2,054 4 10	...	...	2,054 4 10	5,001	0 6 6
3,966 6 1	...	...	3,966 6 1	...	...	3,966 6 1	8,955	0 7 1
3,178 3 0	...	...	3,178 3 0	...	...	3,178 3 0	12,851	0 5 3
1,531 4 7	...	1,475 4 7	56 0 0	...	...	1,531 4 7	1,391	1 1 7
838 2 11	...	...	...	...	838 2 11	838 2 11	1,622	0 8 3
2,369 7 6	...	1,475 4 7	56 0 0	...	838 2 11	2,369 7 6	3,013	0 12 7

Circle is included in the permanent establishment.

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A—VACCINE

Statement No. II. *showing Cost of the Department in the*

Number.	Circles and Districts.	—	Establishment. Inspector of Vaccination and Deputy Sanitary Commissoner.	1st-Class Deputy Inspectors.	2nd-Class Deputy Inspectors.	Vaccination. 1st-Class.	2nd-Class.	Probationers.	Peons.	Expen Pay of Establishment. RS.	A.	P.	Travelling Allowance. RS.	A.	P.	Contingencies. RS.	A.	P.
1	2		3	4	5	6	7	8	9	10			11			12		
37	Chetterpore Circle.	Permanent ...	...	1	...	8	9	...	1	3,589	10	11	25	0	6	3	7	6
38	Chicacole Circle.	Permanent ...	...	1	...	2	8	...	...	2,056	13	2	78	8	0	39	4	8
39	Ganjam Hill Tracts.	Permanent ...	...	1	...	...	6	...	...	1,492	5	7	512	8	3	18	11	4
	Total of the Circles and Districts. ...		1	31	7	169	341	92	26	1,22,335	3	9	7,020	14	8	9,866	2	2
																Military		
1	Bangalore ...	Permanent ...	...	...	...	1	1	...	...	336	0	0	...			...		
2	Secunderabad ...	Do. ...	...	...	...	1	1	...	...	336	0	0	...			...		
3	Kamptee ...	Do. ...	...	...	...	...	1	...	...	120	0	0	...			...		
		Total ...	...	...	...	2	3	...	...	792	0	0	...			...		
																Munici		
1	Chicacole ...	Ganjam District ...	...	...	...	...	1	...	...	144	0	0	...			14	13	3
2	Berhampore ...	Do. ...	...	...	...	...	1	...	...	96	1	6	...			13	0	0
3	Vizagapatam ...	Vizagapatam Dist.	...	...	...	1	...	...	...	102	13	9	...			17	3	7
4	Bimlipatam ...	Do. ...	...	...	...	...	1	...	...	120	0	0	...			60	14	0
5	Vizianagram ...	Do. ...	...	...	...	1	...	...	...	180	0	0	...			7	0	0
6	Cocanáda ...	Gódávári District ...	...	...	...	1	1	...	...	195	0	0	...			...		
7	Rájahmundry ...	Do. ...	...	...	...	...	1	...	...	120	0	0	...			57	5	0
8	Ellore ...	Do. ...	...	...	...	1	...	...	...	168	0	0	...			14	2	3
9	Masulipatam ...	Kistna District ...	...	...	...	1	...	...	...	180	0	0	...			85	0	0
10	Guntoor ...	Do. ...	...	...	...	1	...	...	...	154	8	8	...			80	3	7
11	Nellore ...	Nellore District ...	...	...	...	...	1	...	...	144	0	0	...			20	10	4
12	Conjeveram ...	Chingleput District.	...	...	...	1	...	...	...	180	0	0	...			16	0	0
13	Cuddalore ...	South Arcot Dist.	...	...	...	...	1	...	...	123	0	0	...			55	7	0
14	Chilambaram ...	Do. ...	...	...	...	...	1	...	...	132	0	0	...			9	11	0
15	Trichinopoly ...	Trichinopoly District	...	...	...	1	3	2	...	536	8	0	...			492	14	0
16	Srírangam ...	Do. ...	...	...	...	...	1	...	...	92	8	0	...			6	8	0
17	Tanjore ...	Tanjore District ...	...	...	...	1	1	...	...	291	0	0	...			36	9	2
18	Combaconum ...	Do. ...	...	...	...	1	...	...	...	180	0	0	...			72	9	0
19	Mayaveram ...	Do. ...	...	...	...	...	1	...	...	120	0	0	...			...		
20	Negapatam ...	Do. ...	...	...	...	1	4	...	...	210	7	4	...			10	2	5
21	Mannárgudi ...	Do. ...	...	...	...	1	...	...	...	150	0	0	...			10	0	0
22	Madura ...	Madura District ...	...	...	...	1	2	...	...	458	14	0	...			...		
23	Dindigul ...	Do. ...	...	...	...	1	...	...	...	160	0	0	...			...		
24	Tinnevelly ...	Tinnevelly District.	...	...	...	...	2	...	...	282	0	0	...			11	12	0
25	Palamcottah ...	Do. ...	...	...	...	1	1	...	...	129	9	6	...			2	4	0
26	Tuticorin ...	Do. ...	...	...	...	1	...	...	...	178	0	0	...			62	2	0
27	Kurnool ...	Kurnool District ...	...	...	...	1	...	...	...	168	0	0	...			...		
28	Cuddapah ...	Cuddapah District.	...	...	...	...	1	...	...	120	0	0	...			...		
29	Bellary ...	Bellary District ...	...	...	...	1	2	...	...	456	0	0	...			...		
30	Ádóni ...	Do. ...	...	...	...	1	...	...	...	188	14	4	...			...		
31	Gooty ...	Do. ...								No Vaccinator was employed								
32	Anantapur ...	Do. ...	...	...	...	...	1	...	...	76	0	0	...			...		
33	Vellore ...	North Arcot District	...	...	...	...	2	...	...	240	0	0	...			157	14	4
34	Wállájápét ...	Do. ...	...	...	...	1	...	...	...	212	0	0	...			...		
35	Salem ...	Salem District ...	...	...	...	1	2	...	...	550	12	0	...			5	0	0
36	Coimbatore ...	Coimbatore District.	...	...	...	1	...	...	...	160	2	8	...			17	14	0
37	Erode ...	Do. ...	...	...	...	1	...	...	...	180	0	0	...			...		
38	Karúr ...	Do. ...	...	...	...	1	...	...	...	90	0	0	...			2	10	0
39	Mettapolliem ...	Do. ...								No Vaccinator was employed								
40	Ootacamund ...	Nilgiri District ...	...	...	...	1	...	...	...	239	3	5	...			10	0	0
41	Coonoor ...	Do. ...	...	...	...	1	...	...	...	216	0	0	...			...		
42	Mangalore ...	South Canara Dist.	...	...	...	1	1	...	1	240	8	1	...			6	0	0
43	Tellicherry ...	Malabar District ...	...	...	...	1	...	...	...	149	1	0	...			40	0	0

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DEPARTMENT.

Madras Presidency during the Year **1877-78—(Continued).**

...diture.	Paid from							
Total Cost.	Imperial Funds.	Provincial Funds.	Local Funds.	Municipalities.	Native States, Zemindars, or private Funds.	Total.	Number of all successful Vaccination and Re-vaccination.	Average Cost of each successful case.
13	14	15	16	17	18	19	20	21
RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.		RS. A. P.
3,618 2 11	...	...	3,618 2 11	...	...	3,618 2 11	7,367	0 7 10
2,174 9 5	...	...	2,174 9 5	...	...	2,174 9 5	3,992	0 10 6
2,023 9 2	...	2,023 9 2	...	...	...	2,023 9 2	2,016	1 0 1
1,39,222 4 7	1,282 10 0	23,762 0 8	1,05,630 13 7	7,175 2 5	1,371 9 11	1,39,222 4 7	576,132	0 3 10
Cantonments.								
336 0 0	...	336 0 0	...	...	...	336 0 0	1,280	0 4 3
336 0 0	...	336 0 0	...	...	...	336 0 0	3,406	0 1 7
120 0 0	...	...	...	...	120 0 0	120 0 0	1,574	0 1 3
792 0 0	...	672 0 0	...	...	120 0 0	792 0 0	6,260	0 1 10
...palities.								
158 13 3	...	...	...	158 13 8	...	158 18 8	196	0 12 0
109 1 6	...	...	...	109 1 6	...	109 1 6	230	0 7 7
120 1 4	...	...	...	120 1 4	...	120 1 4	213	0 9 0
180 14 0	...	...	...	180 14 0	...	180 14 0	885	0 7 6
187 0 0	...	...	...	187 0 0	...	187 0 0	584	0 5 4
195 0 0	...	...	...	195 0 0	...	195 0 0	1,410	0 2 0
177 5 0	...	...	...	177 5 0	...	177 5 0	933	0 3 0
182 2 8	...	...	...	182 2 8	...	182 2 8	816	0 3 6
265 0 0	...	...	...	265 0 0	...	265 0 0	1,315	0 3 4
234 12 3	...	...	...	234 12 3	...	234 12 3	975	0 3 10
164 10 4	...	...	...	164 10 4	...	164 10 4	2,235	0 1 2
196 0 0	...	...	...	196 0 0	...	196 0 0	1,258	0 2 6
178 7 0	...	...	...	178 7 0	...	178 7 0	1,090	0 2 7
141 11 0	...	...	...	141 11 0	...	141 11 0	481	0 4 0
1,029 1 0	...	...	...	1,029 1 0	...	1,029 1 0	1,959	0 8 5
99 0 0	...	...	...	99 0 0	...	99 0 0	356	0 4 5
327 9 2	...	...	...	327 9 2	...	327 9 2	1,079	0 4 10
252 9 0	...	...	...	252 9 0	...	252 9 0	791	0 5 1
120 0 0	...	...	...	120 0 0	...	120 0 0	332	0 5 9
220 9 9	...	...	...	220 9 9	...	220 9 9	787	0 4 5
160 0 0	...	...	...	160 0 0	...	160 0 0	520	0 4 11
458 14 0	...	...	...	458 14 0	...	458 14 0	2,713	0 2 8
160 0 0	...	...	...	160 0 0	...	160 0 0	6,852	0 0 4
293 12 0	...	...	...	293 12 0	...	293 12 0	482	0 9 9
131 13 6	...	...	...	131 13 6	...	131 13 6	872	0 5 8
240 2 0	...	...	...	240 2 0	...	240 2 0	859	0 5 0
168 0 0	...	...	...	168 0 0	...	168 0 0	164	1 0 4
120 0 0	...	...	...	120 0 0	...	120 0 0	518	0 3 8
456 0 0	...	...	...	456 0 0	...	456 0 0	1,517	0 4 9
188 14 4	...	...	...	188 14 4	...	188 14 4	1,048	0 2 10
...in this Municipality.								
76 0 0	...	...	...	76 0 0	...	76 0 0	346	0 3 7
397 14 4	...	...	...	397 14 4	...	397 14 4	8,193	0 0 9
212 0 0	...	...	...	212 0 0	...	212 0 0	512	0 6 8
555 12 0	...	...	...	555 12 0	...	555 12 0	1,668	0 5 4
178 0 8	...	...	...	178 0 8	...	178 0 8	1,398	0 2 0
180 0 0	...	...	...	180 0 0	...	180 0 0	262	0 10 11
92 10 0	...	...	...	92 10 0	...	92 10 0	314	0 4 8
...in this Municipality.								
249 3 5	...	...	...	249 3 5	...	249 3 5	899	0 4 5
216 0 0	...	...	...	216 0 0	...	216 0 0	763	0 4 6
246 8 1	...	...	...	246 8 1	...	246 8 1	2,005	0 1 11
189 1 0	...	...	...	189 1 0	...	189 1 0	557	0 5 5

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A—VACCINE

STATEMENT No. II. showing Cost of the Department in the

Number.	Circles and Districts.	—	Establishment. Inspector of Vaccination and Deputy Sanitary Commissioner.	1st-Class Deputy Inspectors.	2nd-Class Deputy Inspectors.	Vaccination 1st-Class.	Vaccination 2nd-Class.	Probationers.	Peons.	Expen Pay of Establishment.	Travelling Allowance.	Contingencies.
1	2		3	4	5	6	7	8	9	10	11	12
										RS. A. P.	RS. A. P.	RS. A. P.
44	Calicut ...	Malabar District...	...	...	...	...	2	...	...	230 0 0	...	24 0 0
45	Palghaut ...	Do.	...	...	...	...	1	...	...	120 0 0	...	...
46	Cochin ...	Do.	...	...	...	...	1	...	...	144 0 0	...	27 12 6
47	Cannanore ...	Do.	...	...	...	1	...	...	...	260 0 0	...	...
	Total of the Municipalities ...		...	...	...	29	36	2	1	8,868 11 3	...	1,447 5 5
	Grand Total ...		1	31	7	200	380	94	27	1,31,993 15 0	7,020 14 8	11,313 7 7

DEPARTMENT.

Madras Presidency during the Year 1877-78—(Continued).

...diture.	Paid from							
Total Cost.	Imperial Funds.	Provincial Funds.	Local Funds.	Municipalities.	Native States, Zemindars, or private Funds.	Total.	Number of all successful Vaccination and Re-vaccination.	Average Cost of each successful case.
13	14	15	16	17	18	19	20	21
RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.		RS. A. P.
254 0 0	...	...	...	254 0 0	...	254 0 0	1,117	0 3 7
120 0 0	...	...	...	120 0 0	...	120 0 0	612	0 3 2
171 12 6	...	...	...	171 12 6	...	171 12 6	444	0 6 2
260 0 0	...	...	...	260 0 0	...	260 0 0	1,080	0 3 10
10,316 0 8	...	...	...	10,316 0 8	...	10,316 0 8	52,685	0 3 2
1,50,330 5 3	1,282 10 0	24,484 0 8	1,05,680 13 7	17,491 3 1	1,491 9 11	1,50,330 5 3	6,35,027	0 3 9

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B—DISPENSARY VACCINATION.

STATEMENT No. III. *showing Dispensary Vaccination in the Madras Presidency during the Official Year* 1877-78.

Districts.	Number of Dispensaries in each District to which a Vaccinator is attached.	Average Number of Vaccinators attached to Dispensaries during the season.	Total Number of Persons vaccinated.	Average Number of Persons vaccinated by each Vaccinator.	Primary Vaccination.				Re-vaccination.		Percentage of Successful Cases.	
					Total.	Successful.			Total.	Successful.	Primary.	Re-vaccination.
						Under one Year.	Over one and under six Years.	Total of all Ages.				
1	2	3	4	5	6	7	8	9	10	11	12	13
South Arcot.												
Old Town, Cuddalore...	1	1	388	388	388	36	134	157	...	...	84·27	...
New Town, Cuddalore.	1	1	196	196	196	19	90	28	...	...	69·89	...
Total ...	2	2	584	292	584	55	224	185	...	...	77·4	...

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COMPARATIVE STATEMENT No. IV. *showing the Number of Persons Primarily Vaccinated and the Number of those Persons who were successfully vaccinated in the Madras Presidency in each of the undermentioned Official Years.*

Establishment.	Persons Primarily Vaccinated.													
	Total Number.	Number successfully vaccinated.	Total Number.	Number successfully vaccinated.	Total Number.	Number successfully vaccinated.	Total Number.	Number successfully vaccinated.	Total Number.	Number successfully vaccinated.	Total Number.	Number successfully vaccinated.	Total Number.	Number successfully vaccinated.
	Years ended 31st March													
	1871-72.		1872-73.		1873-74.		1874-75.		1875-76.		1876-77.		1877-78.	
Local Funds	190,229	174,047	282,530	213,918	285,298	263,856	359,929	315,652	327,293	272,733	410,497	350,763	676,998	564,976
Military Cantonments	4,463	4,065	3,765	3,461	4,270	3,823	4,389	3,231	5,323	4,810	4,997	4,514	6,726	6,221
Native States	33,722	31,354	31,528	29,491	4,424	3,797	5,391	4,638	4,245	3,637	3,847	3,255	6,169	5,479
Municipalities	28,298	24,123	42,219	36,539	42,646	37,998	33,606	28,874	28,832	25,077	40,441	35,392	57,223	51,141
Private Vaccinators	1,104	1,075	3,228	3,092	5,192	5,008	6,062	5,838	5,984	5,596	3,048	2,795	471	471
Railway Apothecaries	23	13	12	10	4	4	10	9	...	...	57	49	10	7
Medical Subordinates	18,899	12,063	23,447	14,900	20,890	14,477	17,251	12,290	11,082	7,067	15,753	9,553	28,584	19,488
Dispensaries	584	532	751	728	675	635	2,029	1,606	408	297	87	77	584	364
	276,822	247,272	386,480	302,139	363,399	329,598	428,667	372,048	383,067	319,129	478,727	406,398	776,705	648,097

N.B.—Re-vaccinations are wholly excluded from this statement.

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GOVERNMENT OF MADRAS.

PUBLIC DEPARTMENT.

ORDER THEREON, 28th November 1878, No. 1,724.

It has not been the practice of Government hitherto to review the annual record of the health and sanitary progress of the Presidency prepared by the Sanitary Commissioner, and the work of that officer, but the instructions of the Government of India (Resolution No. 364, 26th February 1878) render such review now necessary. On the present occasion however His Grace the Governor in Council would be unwilling under any circumstance to permit the wide, accurate, and judicious observations on the health history of a year marked by such exceptional conditions, now laid before him by Dr. Cornish, to pass without the notice they intrinsically deserve, and the interests involved demand.

2. The above papers are accompanied by diagrams illustrating the rainfall of the famine years compared with the average of the preceding five years,—also the price of the staple articles of food consumed by the population for the same periods. Appendix No. 1, a special paper by Dr. Cornish on the Sanitary and Medical aspects of the famine, contains moreover a similar diagram exemplifying the effects of the famine on the fecundity of the people. These diagrams are unique, and the Government desire that similar illustrations be prepared each year by the Sanitary Commissioner, and submitted with his annual report.

3. In the first section Dr. Cornish sums up the Meteorological history of the year. The intensity of solar heat and the deficiency of the rainfall, phenomena which appeared concurrently in other large tracts of the globe, are its special characteristics; and it is highly satisfactory in the interests of science that observations thereon should have been recorded by an observer of the exceptional qualifications possessed by Mr. Pogson. The scientific bearings of Mr. Pogson's opinions must be left for solution to the world of science, but the Government cannot omit to note the Astronomer's deliberately recorded opinion that "the recurrence" of the rain deficiency "between 1887 and 1889 may be as certainly anticipated as that of any other natural periodical phenomenon with the laws and working of which we are already much better acquainted."

In view of this forecast, it will be specially necessary to cause all future suggestive phenomena to be carefully noted and published.

4. Dr. Cornish's remarks on the food of the laboring classes of the Peninsula, and on their habits, are deserving of great attention, and especially his opinions as to the disastrous effects, on the health of the distressed populations, of the unavoidable change in the principal article of diet from millet-grains to rice.

5. The causes of certain differences in the tables of statistics relating to the European Army are explained in paragraphs 33 and 34, Section II. The continuance of these different methods of recording deaths seems hardly necessary, and the attention of His Excellency the Commander-in-Chief will be invited to the subject. The health of the European Army must be regarded as very satisfactory considering the great prevalence of the severest forms of epidemic disease, cholera and small-pox, among the native populations of the principal stations in which they were located. The average (58·7) daily sick per mille, though nearly 3 per cent. in excess of the proportion of the preceding year, was approximately 1 per mille less than the figures of 1872 and

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1873; 5 per mille less than those of 1870; and over 10 per mille less than in 1866. The Sanitary Commissioner's remarks regarding the disturbance caused in the health statistics by the tendency of Medical Officers to return as "enteric" or typhoid—fevers which have hitherto been recorded as "continued," seem to demand attention from the Army Medical Authorities.

From cholera there were nineteen deaths among thirty-five cases, occurring in eight of the nineteen stations occupied by British troops. No less than ten of the deaths happened at Thayetmyo in British Burmah. The precautionary suggestions of the Sanitary Commissioner are deserving of serious attention.

The mortality among children was proportionately greater than among adults, 179 deaths having occurred among a strength of 2,758, or 64·9 per mille; the admissions to hospital being 700·8 per mille. The proportion of deaths has only thrice been exceeded during the last ten years, viz., in 1869, 1870, 1872, when the figures were respectively 74·02, 65·4, and 68·5.

As regards the health of particular stations, the excessive number of venereal cases in Bellary, Madras, St. Thomas' Mount, and Secunderabad is noteworthy; also the prevalence of fevers among H.M.'s 89th and 43rd Light Infantry at Cannanore, these troops being fresh arrivals from England, and consequently unacclimatised; and lastly the prevalence of fevers at Wellington. Dr. Cornish remarks in regard to Wellington:—"Experience has always shown that seasons of great dearth and drought in the plains of India are very dangerous to health in the elevated mountain plateau, and the experience of the past year has proved the general accuracy of the conclusion." "All the hill stations of the Nilgiris were unhealthy in 1877, and cholera for the first time in half a century prevailed for several weeks in an epidemic form in Ootacamund and Coonoor, while small-pox and fevers were rife among the native inhabitants, who suffered greatly from drought and scarcity of food."

The sanitary condition of the principal Nilgiri hill stations is receiving the serious consideration of Government.

6. The health of the Native Army was not so satisfactory as usual, but considering the prevalence of disease and famine it is remarkable that the death-rate was not much higher than it actually was. The average daily sick was greater than that of any year since 1870, whilst the deaths in hospital were more numerous than those of any year during the last decade, though the proportion of deaths out of hospital was below that of six years in the ten. Of stations, the Nicobars seem the most unhealthy, every man getting fever, and being repeatedly in hospital. The exceptionally bad health returns of Pallavaram are explained. Intrinsically this station is very healthy.

7. The very large mortality in the Jails of this Presidency is fully explained. His Grace in Council is inclined to concur with the Sanitary Commissioner in his remarks on the prevalence of cholera in the Chittur and Madura Jails. The Inspector-General of Jails will report thereon. His attention will also be drawn to Dr. Cornish's thoughtful remarks in regard to jail diet in p. 311, and he will be requested to state how far this tendency to favor a rice-diet is checked.

8. His Grace in Council fully endorses Dr. Cornish's remarks regarding the utility of registration of births and deaths even as now carried out with all its imperfections and defects. The system of registration now pursued is no doubt capable of great improvement, especially in rural tracts. In Municipal towns registration of births and deaths is compulsory by law, and consequently the registration statistics of Municipal towns are no doubt much more accurate than those of rural tracts: His Grace in Council is not as yet prepared to legislate for the rural districts, but much can be done by the Revenue officials to improve the state of the registration by scrutinizing the village returns, and punishing departmentally any village officer who is proved to be careless and inaccurate in his returns. The Government are not prepared at present to cast on the District Civil Surgeon the duty of supervising the work of the clerks engaged in the compilation of the returns, but they consider it desirable that the statistical information regarding the births and deaths of his district should be remarked on by him. In future, accordingly, the returns will be forwarded to him for remark by the Collector before transmission to Madras; and on return the

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Collector will take such action on any suggestions as to him may seem necessary. The Sanitary Commissioner when compiling his monthly statistics will bring any matter of exceptional interest to the notice of Government, as well as any irregularity or other vitiating fault, and all Presidents of Municipalities will follow the same course. The Government trust by these tentative means that the Sanitary Commissioner will be able to exercise a more direct supervision over the registration of the Presidency, and that gradually the District Civil Surgeons will learn to take a wide interest and acquire a varied experience of the health conditions of their districts—a condition which must precede the establishment of a health department which is the desire of Dr. Cornish.

9. In regard to the sanitary condition of Municipal towns, His Grace in Council does not propose to enlarge here, but he is of opinion that the advantage of the Sanitary Commissioner's or Deputy Sanitary Commissioner's inspectional visits would be much greater, if his reports were submitted to Government. In future after inspecting a town in person or by his Deputy, the Commissioner will furnish a copy of his notes to Government, at the same time sending a copy to the President of the Municipality concerned; whose duty it will be after laying the same before the Commissioners to communicate their remarks, with his own views thereon, to Government.

10. His Grace in Council does not propose here to follow Dr. Cornish's interesting remarks on the effects of famine, on the fecundity of the people, on the varying death-rate with the varying ages of the population, and the varying death-rate among the several classes of the community. They will doubtless receive the careful attention of the Famine Commission. It is, however, especially noteworthy that the death-rate among the Musalman population was considerably below that of the Hindu population. The cause of this probably is that, though in many cases very poor, the Musalman laboring population are not generally dependent on agricultural labor for a subsistence. The townspeople were generally fully engaged in distributing the food of the people, and consequently the working Mahomedans had generally the means of earning a livelihood.

11. In Section VI of the report the Sanitary Commissioner discusses the general history of the chief diseases prevalent in the Presidency, especially with reference to the famine phenomena. As regards cholera, the deaths from which numbered 357,430, he finds that "there was no relation between the intensity of famine and the intensity of cholera," whilst "those who look to the condition of a water-supply as explaining the virulence of cholera epidemics will find ample confirmation of their views in the peculiarities of 1877." Dr. Cornish points out that a great portion of the mortality from this cause in this disastrous year cannot be directly traceable to famine; but however this may be, the fact cannot be lost sight of that the deaths were mainly among the poor, whose supplies of food were running short. No less than 88,321 persons are returned as having died of the plague of small-pox. In the city of Madras, the population of which is estimated to have been raised by 50 per cent. through the influx of paupers, the deaths from this cause numbered no less than 17·4 per mille of the ordinary town population.

Suicides	2,575
Wounding	1,372
Accidents	10,425
Snake bite	2,088
Total ..	16,460
1876 ..	11,175

12. The increase in deaths from injuries is marked, but it is noteworthy that though abnormal mortality occurred from want, the number of suicides is not much above the ordinary figures. The suicidal mania seems to demand high nervous agitation, a condition which is wanting in the perishing starveling.

13. Section IX—General Remarks—contains many valuable notes on the health organization of the city of Madras during the famine, and other questions connected with the adequacy of wages on famine works for the support of the workmen in health, and other matters of great importance, but His Grace in Council does not propose to enter into these questions here.

14. In Appendix No. 1 Dr. Cornish has gone more fully into the various questions connected with the Sanitary and Medical aspects of the famine, and appends

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a very valuable paper from a scientific point of view on Famine Pathology by Surgeon Major A. Porter. These papers His Grace the Governor in Council has perused with the greatest interest, and Surgeons-Major Cornish and Porter have his cordial recognition of their labors to throw light upon the medical history of a year which, if fully, wisely, and equitably recorded, a task which it is the earnest wish of His Grace in Council to see performed, will be fraught with lasting advantage to a future generation should it be called on to deal with a calamity similar to that which has befallen the people of the Peninsula during the last two years.

(True Extract.)

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